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CLASSICAL SERIES.

I.

REPORT ON THE INVESTIGATIONS AT
ASSOS, 1881,

By JOSEPH THACHER CLARKE.

With an Appendix,

CONTAINING INSCRIPTIONS FROM ASSOS AND LESBOS,
AND PAPERS

By W. C. LAWTON AND J. S. DILLER.

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ERRATA.

Page 2, line 16. For "perhaps so called from one of the emirs serving under the conqueror Orkhan," read *so called from Machrama, last of its Greek defenders*. The interesting episode of the fall of Assos into the hands of the Turks will be treated at length in the Second Report.

Page 20, line 2. For "Agichristo," read *Hagichristos*.

" 27, " 5. *Dele* "Dolmas, or."

" 27, " 15. For "workmen," read *Greek workmen*.

" 33, " 31. For "southwestern," read *southeastern*.

" 34, " 5. For "northeast," read *northwest*.

" 51, " 19. For "trachyte," read *volcanic rocks, andesite and liparite*.

(Throughout the volume, for "trachyte" read *andesite*. The accurate determination of the material, in this case only possible after microscopical examination, was made by the geologist of the Expedition during the summer of 1882.)

Page 53, line 26. For "noble," read *famous*.

" 59, " 5. For "west," read *east*.

" 59, " 27. For "were of the same stock," read *were perhaps of the same stock*.

Page 60, line 18. For "maternal grandfather of Hector," read *father-in-law of Priam*.

Page 67, line 29. For "west," read *east*.

" 71, " 2. For "probably with Assos, although this name does not occur," read *with Assos, which appears in the list under an altered name*.

Page 71, line 3. For "between 440 and 436 B. C.," read *the third quarter of the fifth century B. C.*

Page 77, line 23. *Dele* "Semitic."

" 84. *Dele* lines 24 to 27.

" 90, line 24. *Dele* sentences commencing "The epistyle," and concluding, page 91, line 13, "contact." (The peculiar arrangement of the inner epistyle beams, which became evident through the investigations of the second year, will be fully explained in the Second Report. The beams were double, — not treble, as shown in Plate II.)

Page 92, line 10. *Dele* "into which the thin slabs of the metopes, whether sculptured or plain, could be slid from above."

Page 96, line 2. *Dele* "The upper end of the former was provided with a projecting band to hook unto the timbering of the roof."

Page 96, line 32. For "about 0.6," read 0.66.

" 97, " 10. For "average 0.280," read *each average 0.280*.

" 97, " 18. Add note: *These dimensions are subject to a micrometrical correction, resulting from the slight inaccuracy of a steeltape employed in measuring.*

Page 103, line 8. For "of the temple," read *the temple*.

" 103, " 9. For "of the temple," read *and the temple*.

" 123, " 6. For "The greater part of the edifice is Byzantine," read *The edifice is referable to the earliest ages of Turkish architecture, — probably to the fourteenth century.* (The age of the mosque did not become apparent until it was examined more closely than was possible during the first year.)

Page 140, last line but one. For "ΠΟΠΛΙΩΤ," read ΠΟΠΛΙΟΥ.

The three inscriptions in pp. 133-140 (Nos. I., II., and III.) will be found in the first volume of *Papers of the American School of Classical Studies at Athens* (*Inscriptions of Assos*, Nos. XXVI., VII., and XXVIII.), with corrections in the text and in the translation. Nos. II. and III. are now in the Museum of Fine Arts in Boston.

REPORT

ON THE

INVESTIGATIONS AT ASSOS, 1881.



PLATE I.

PRELIMINARY REPORT
OF THE
INVESTIGATIONS AT ASSOS
DURING THE YEAR 1881.

THE following account of the first year's work of the expedition to Assos sent out by the Archæological Institute of America must be prefaced by a reminder that the time has not come for a thorough and conclusive publication of the results achieved. It is evident that descriptions of monuments but recently discovered, and in part still hidden beneath the earth, will be extended, and possibly corrected, as the studies upon the site advance. Indeed, many points are touched upon in this Report only to indicate the direction and scope of the work. After the termination of the investigations, it is hoped to present the full results in a monumental volume upon Assos and the Southern Troad.

The present Preliminary Report is divided into two parts. The first — more or less introductory — contains a notice of the visits to the site by travellers and archæologists during the past century, and an account of the present expedition. The second treats of the geographical conditions of the region and their influence upon the development of Assos during antiquity, of the history and topography of the city, the architectural monuments investigated, and the sculptures and inscriptions discovered.

A description of the temple and its important reliefs is given in detail. The account of other buildings is less full, a consideration of many points already determined being reserved for the report upon the fortification walls, theatre, stoas, gymnasium, etc., which will be prepared after the close of the work of the second year.

An appendix is furnished by the geologist of the expedition, Mr. Joseph Silas Diller, containing the results of his special studies at Assos and excursions in the Troad.

The last sparks of Greek civilization, the various phases of which had for twenty-four centuries been exhibited at Assos, were extinguished by the Latin conquest of Constantinople. The establishment of the Genoese principality of Lesbos was soon followed by the inroads of the Turks. Assos was deserted and forgotten. Its ruins are to-day a nameless appendage to the squalid village of Behràm,¹ perhaps so called from one of the emirs serving under the conqueror Orkhan. Once the most important city of the Troad, it is now represented by a hundred miserable dwellings. Its commercial prosperity declined with the failure of the agricultural energy which

¹ The orthography of personal and geographical names in the present Report requires a word of explanation. Turkish names — as derived from an alphabet wholly distinct from the English — are rewritten according to their sound, the letters having in every case the value peculiar to them in English. It is impossible, however, by any combination of letters, to convey the sound of the ζ — the sharply aspirated z , like the German ch in ach — which occurs in the name Behràm; and it is to be observed that the final ee so frequently employed (Pademleè, Sazleè, Narleè, etc.) approaches in character the French u , or German ue , a vowel not known in English.

The Greek spelling of Greek names has been adopted whenever the word has not, by long use, become fully Anglicized; that is to say, changed in *pronunciation*. As the English alphabet provides two letters for the Greek $\kappa\alpha\pi\pi\alpha$, the c has been employed as the more familiar (Corinth, Acropolis, etc.), except in cases where the true sound is not thereby conveyed: namely, before e , i , and y , when the k has been substituted. As no English word ends in i , the final ai is transformed to ae , according to the universal usage of our tongue.

once had produced upon the plains of the Satnioeis the finest wheat known to the Persian court. The land became a stronghold of Mahometan fanaticism. The austere and bigoted character of the Turks of the Troad was remarked by early travellers,¹ and it is still uncomfortably evident. It is true that no open attempt is now made in times of peace to persecute unbelievers; but in their presence there is a lowering constraint on the part of the men, while women hasten from the sight of an infidel, or, crouching behind some shelter, shield the terrified children with their skirts.

Strange as it may appear to those acquainted with the mixed population of the more southern coasts of Asia Minor, it has been only within late years that Greek settlers have been able to gain a foothold in the Southern Troad. At the important port of Babà-calessi² there is but one Greek merchant; at Behràm only one magazine is Greek; and in the interior the number of Christian inhabitants is very small. That the time is rapidly approaching when the land will be held in great part by Greeks, no one can doubt who has observed the progress of that people, and the melting away of the Turkish population.

The Gulf of Adramyttion is dominated by Ivalee,³ opposite the northern coast, and distant from it but two hours' sail. The modern history of this city well illustrates the position of the two races, and foreshadows the development of the Troad in the near future. The inhabitants of the Turkish town of Ayasmat⁴ totally destroyed Ivalee during the War of Independence, confiscating the olive orchards and the vineyards

¹ Michaud et Poujoulat, work quoted below, p. 9.

² The promontory of Lecton is known to the Turks as Babà; the town at its extremity as Babà-calessi, *i.e.*, Babà-castle, from the considerable fortifications and garrison there maintained.

³ On the site of the ancient Heracleia.

⁴ On the site of the ancient Attea, or Attalia.

in its neighborhood. To-day, however, nearly forty thousand Greeks inhabit Ivalee, and not one Turkish family; while for miles around the city all the land is again in the possession of Greeks. Ayasmat, on the other hand, has dwindled to a squalid village of twenty or thirty huts, with a Moslem graveyard more than a mile long.

The sparsely populated northern coast of the Gulf of Adramyttion lies off the line of the marine traffic, which the formation of land and sea has led into fixed courses in this part of the Mediterranean. The steamers which constantly ply between Constantinople and Smyrna seek escape in the Channel of Mytilene from the high winds which disturb the open Ægean, and pursue their sheltered course along the island; and travellers commonly pass through the strait without giving much attention to the steep and sterile volcanic plateau, which rises toward the sea as a wall, enclosing the isolated valleys where trickling streams maintain a luxuriant verdure throughout the long heats of summer. The smallest coasting vessels are seldom forced to make the northern coast of the gulf at any point east of Babà. Some twenty years ago the Austrian steamers stopped at Babà-calessi; but this route was abandoned, from the lack alike of freight and of passengers. The annual crop of valonia (the cups of the acorn of *Quercus ægilops*) and the occasional surplus of wheat grown in the alluvial plain of the Touzla are exported by native merchants.

Though Edremit (Adramyttion), at the head of the gulf, has remained a populous town under the Turks, the commercial prosperity which it enjoyed under the rule of the kings of Pergamon has been wholly lost. During the centuries in which great thoroughfares existed from Pergamon to the Hellespont by way of Adramyttion, the distance of eight kilometres between the city and the sea and the lack of an adequate harbor were not obstacles that prevented the city

from having a thriving trade ;¹ the port continued to be a considerable emporium as late as the time of the Latin princes, but under Turkish rule it had become almost entirely deserted by the middle of the last century. The products of the fertile land in the vicinity of Edremit now pass into the hands of the ever busy Greeks, and are carried to Ivalee by the ten thousand camels of this Vilayet, being thus still further removed from the northern coast of the gulf.

So little have these waters been frequented by well-manned European vessels, that even in our days the nooks of the Gulf of Adramyttion have been among the last resorts of Greek pirates, — sharing notoriety, in this respect, with the shores of inhospitable Amorgo.

In short, the isolation of the Southern Troad, by reason of the configuration of the land and the peculiarities of its inhabitants, was so complete, that at the beginning of this century, when the present Renaissance of Greek thought and art was far advanced in Attica, and when even the neighboring plain of Troy was familiar to us from the reports of many travellers, all our knowledge of Assos was restricted to the imperfect description given by Count Choiseul-Gouffier in his "Picturesque Voyage."² The Count had made his first journey to the Levant in 1776 ; his appointment, eight years later, as Minister Plenipotentiary of France to the Porte, gave him an exceptional opportunity for the completion and extension of studies which, though in many respects of naïve inaccuracy, were of great value in calling the attention of European scholars to sites previously unexplored.

¹ Compare *Acts of the Apostles*, xxvii. 2.

² *Voyage Pittoresque de la Grèce*, tome second. Paris, 1809 ; pp. 86-88. In 1819 Choiseul's map received some corrections and additions founded upon the observations of M. Dubois, who had been sent to the Troad in the preceding year by M. de Choiseul-Gouffier. The first volume of the *Voyage Pittoresque* was published in 1782.

M. de Choiseul gives a strange and confused plan of the city,¹ and a wonderful restored view of the site. The letter-press is better than the illustrations, and affords a compilation of the remarks of ancient authors bearing upon the subject, so thorough as to suggest the work of a literary assistant. The erroneous assumption of three temples at the foot of the Acropolis is not surprising, being evidently based on the peculiar formation of the stoa plateau, with its terraces at either end. It is worthy of remark that this first account with all its shortcomings yet shows its author's appreciation of the striking situation of the city, which has not failed to kindle the admiration of every subsequent traveller. "*Peu de villes,*" says the author, "*jouissent d'une situation aussi heureuse, aussi magnifique que celle d'Assos ; l'imagination des plus habiles artistes ne sauroit aller au-delà des tableaux, si riches, si imposans, qu'elle devoit jadis présenter de toutes parts.*"

But though the detailed plan and restoration of the city, given in the "Picturesque Voyage," were fanciful and incorrect, the accompanying maps of the Troad were long the chief source of information for that important part of Asia Minor, being even reproduced with but few alterations as late as the publication of Mauduit's book upon the Troad.²

The influence of the "Voyage Pittoresque" is evident, from the fact that nearly half of the travellers who have subsequently visited and described Assos have been French, that the only extended investigations upon the site were made at the expense of the French Government, and that the celebrated reliefs of the temple were finally obtained by the Louvre, and transported to France on a national vessel.

Eight years before the appearance of Choiseul-Gouffier's

¹ And yet the author congratulates himself that, "Le plan qu'offre la planche IX. a été levé avec exactitude."

² *Découvertes dans la Troade.* Paris. 1844.

volume Assos was mentioned by M. Olivier,¹ in a book which gives much information concerning the condition of the Troad during the last decade of the eighteenth century; but the author did not land at Behràm, contenting himself with examining the coast from his vessel.

That eminent authority upon the topography of ancient Greece, Colonel Leake, visited Assos in the year 1800. His short notice of the site was first published in 1817 in the continuation of Walpole's "Memoirs relating to European and Asiatic Turkey,"² and several years later appeared in his own "Journal."³ This writer, whose extended travels and great erudition give his opinion decisive weight, considered the remains of Assos to present the most perfect idea of a Greek city that is anywhere to be obtained.

Dr. Hunt saw the ruins one year after Leake; his report was the first to be printed,⁴ though not till sixteen years after his visit. Hunt's accurate and detailed account of the theatre is particularly valuable, and his description of the temple, the porticos with their inscriptions, the antique edifice used as a Turkish bath, etc., cause wonder that the ruins above ground should have remained in so perfect a state of preservation so late as the beginning of the present century, and regret that the excavations advised by him should not then have been undertaken. Well might they have been

¹ *Voyage dans l'Empire Ottoman, l'Egypte et la Perse. Fait par ordre du Gouvernement pendant les six premières années de la République*, par G. A. Olivier. Paris. An 9. Vol. i., chap. xxv.

² *Travels in Various Countries of the East; being a continuation of Memoirs relating to European and Asiatic Turkey*. Edited by Robert Walpole. London. 1820.

³ *Journal of a Tour in Asia Minor, with comparative remarks on the ancient and modern geography of that country*. By William Martin Leake. F. R. S., etc. London. 1824.

⁴ *Memoirs relating to European and Asiatic Turkey, edited from manuscript journals*, by Robert Walpole. London. 1817. Number VI. Account of Dr. Hunt and Prof. Carlyle.

“repaid by the discovery of many valuable works of art,” had they been prosecuted before the lamentable destruction of later years.

Hunt was succeeded by Von Richter, whose interesting sketch, valuable especially in its description of the walls, was published seven years after, in a book which is the best monument to one who found an untimely grave while in the midst of his Oriental investigations. Von Richter visited Assos in June, 1816. It was upon this journey that he caught the fever which left him scarcely time to relate his observations in his journal, published by Ebers.¹

Philip Barker Webb's studies upon the Trojan Plain were extended to Assos, and were first printed in Italian, in the “Biblioteca Acerbi,” in the volumes for June and July, 1821.² It was through him that attention was first called to the interesting geological character of this volcanic region.

At a later date the vicinity was explored and described from a scientific point of view by the eminent Russian geographer Tchihatcheff,³ whose routes upon the map, given to illustrate his itinerary, show him to have visited Assos in 1847 and 1849. It is greatly to be regretted that the fourth part of Tchihatcheff's great work, which was to be devoted to the statistics, politics, and archæology of the country, should never have appeared. His most interesting results, if not wholly lost, have thus been too greatly delayed to be of full service to science.

¹ Otto Friedrich von Richter. *Wallfahrten im Morgenlande. Aus seinen Tagebüchern und Briefen dargestellt von Johann Philip Gustav Ebers.* Berlin. 1822.

² Better known in a later French edition: *Topographie de la Troade.* Paris. 1844. Webb complains, in the preface to the republication, that the studies had not attracted due attention in their original form. They had meanwhile been translated into German; but this work does not seem to have appeared in a large edition, as it is rare and little known, notwithstanding its importance.

³ *Asie Mineure, description physique, statistique et archéologique de cette contrée.* Par Pierre de Tchihatcheff. Paris. 1853-1869.

By far the best description given by any traveller is that of Prokesch von Osten, whose most admirable book of "Oriental Notes,"¹ justly led to the author's preferment to high official position. The letter relating to the ruins of Assos is dated at Mytilene, July, 1826; in it the author speaks of the remains as the best preserved of all between the Propontis and the Ionian coast. Apart from the interest of the general account, the technically correct descriptions and accurate measurements of monuments, then still in a comparatively perfect state, are of a value to the present investigations which may be estimated from the fact that the given dimensions of the theatre and fortification walls, for instance, are not only more trustworthy, but more complete, than those in the pretentious work of the later French expedition under Texier.

After a lapse of thirty years, when the writings of Choiseul and Olivier had become antiquated, the attention of the French was again called to the ruins of Assos by the Oriental correspondence of Michaud and Poujoulat.² These companions were separated at Babà,—Poujoulat going on horseback to Behràm, while their coasting vessel, upon which Michaud remained, ill of a fever, was driven from the insecure port at the cape by a storm of wind. Poujoulat's description of his journey to the ruins of Assos is graphic; but his understanding of the antique was inadequate and led him into absurd mistakes, a number of which will be mentioned later on.

The admirable survey of the northern coast of the Gulf of Adramyttion, made by Commander Copeland of the English Navy, is dated in 1834.³ Upon it the position of Behràm is

¹ *Denkwürdigkeiten und Erinnerungen aus dem Orient*, vom Ritter Prokesch von Osten. Aus Julius Schneller's Nachlass herausgegeben von Dr. Ernst Münch. 3 Bände. Stuttgart. 1836-37.

² *Correspondance d'Orient*. Par M. Michaud, de l'Académie française, et M. Poujoulat. Vol. iii. Paris. 1834. Lettre lxix.

³ Charts of the English Admiralty, No. 1665. Mytilene Island.

accurately designated, though the independent character of the volcanic peak is overlooked.

It was in June, 1835, five years after the visit of Poujoulat, that Charles Texier, commissioned by Guizot, who was then the French Minister of Public Instruction, to study the antiquities of Asia Minor, examined the ruins. The results of his expedition were most luxuriously published, at government expense, in three immense volumes, in the second of which are the plates and letter-press concerning Assos, the illustrations being restricted to the fortifications and the temple of the Acropolis.¹

Unfortunately, as more recent scholars have frequently had occasion to remark,² the facile architect and director of the expedition had *le génie de l'inexactitude*. Texier's detailed topographical plan of the city is hardly creditable as a sketch from memory. The given measurements, though expressed in the smallest fractions of the metric system, are often wholly fictitious, the restorations largely imaginary. Even were the present expedition to do no more than accurately to determine the points treated with such unworthy carelessness by Texier, it would render a definite and valuable service to archæological science.

By the successive labors of Poujoulat, Huyot, and Texier, the reliefs of the epistyle and metopes of the temple, which

¹ *Description de l'Asie Mineure, faite par ordre du Gouvernement français de 1833 à 1837 et publiée par le Ministère de l'Instruction publique.* Par Charles Texier. Deuxième partie, deuxième volume. Paris. 1849. The eminent architect and archæologist, Huyot, who had visited Assos about 1817, and made drawings of the remains, is said to have directed the attention of Texier to Assos, and to the reliefs which lay exposed upon the sides of the Acropolis. Huyot is said by Clarac to have attempted to carry off the sculptured blocks.

² Referring to the account of Old Symrna, given by Texier, Dr. Hirschfeld says: "Leider muss dieselbe beinahe als werthlos bezeichnet werden; denn die elegant gezeichneten Formen entsprechen der Wirklichkeit in keiner Weise." (Compare the paper by Dr. Curtius in the *Abhandlungen der berliner Akademie*, 1872.) The remarks of M. Perrot upon the plates concerning Pessinunt are even

lay exposed upon the summit of the Acropolis and its south-eastern slope, appear to have become regarded as due to France; and the well-known archæologist, Raoul-Rochette, having succeeded in obtaining a formal grant of the blocks as a gift of the Sultan Mahmoud II. to the Louvre, they were removed in 1838. Through these remarkable archaic works of sculpture the attention of every scholar of Greek antiquity and art has been attracted to Assos. Three publications¹ have made them familiar to those unable to study the originals, or the casts exhibited in European and American capitals.

Shortly before the reliefs were loaded upon the brig "La Surprise," of the French navy, they were seen upon the site by Sir Charles Fellows, in whose interesting "Journal"² there

more to the point, as illustrating Texier's manner of dealing with a subject in every way comparable to Assos: "Le plan donné par M. Texier . . . est une mauvaise plaisanterie. Il donne des noms à tout, il indique la disposition intérieure de tous les édifices jusque dans leurs moindres détails; il ne vous fait pas grace d'une colonne, quand, de son propre aveu, il n'a passé là que quelques heures, et s'est borné à noter, du haut de l'acropole, la situation relative des différents amas de décombres qu'il apercevait dans différentes directions." (Lettre de M. Perrot à M. Renier. *Bullettino dell' Istituto di Corrispondenza archeologica*. 1861. VIII., Agosto.) A full review of Texier's shortcomings in regard to Assos would here lead to too great length; a number of points will, however, be mentioned in the consideration of the temple.

¹ In lithographed plates, with two pages of inadequate text, by M. F. de Witte, in *Annali dell' Istituto di Corrispondenza archeologica*. Volume tredicesimo. Roma, 1842; and in *Monumenti inediti pubblicati dell' Istituto*, etc. III. Roma e Parigi, 1839-43. In the second volume of Texier's *Description de l'Asie Mineure*, referred to above, and in Clarac's *Musée de Sculpture, antique et moderne; ou Description historique et graphique du Louvre et de toutes ses parties*, etc. Tome II., seconde partie. Paris, 1841. Texier's engravings are the best representations of the sculptures, though they do not include all the reliefs. Clarac's text gives a detailed account of the removal of the blocks, and of the sawing to which they were subjected to prepare them for the walls of the Assos Room in the Louvre. A full review of these publications is reserved for an essay on the temple sculptures, which is to appear among the papers of the Institute.

² *A Journal written during an excursion in Asia Minor*. By Charles Fellows. London. 1839.

are drawings of the most prominent blocks, as well as a good general description of the ruins.

He was followed by another English traveller, signing himself "G. R. L.," who contributed a short but well-written notice of Assos to the "Gentleman's Magazine" in 1842.¹

The geographical studies of Dr. Henry Kiepert and Prof. A. Schoenborn in the Southern Troad were made at about this date; they will be referred to below in the consideration of the maps of the land.

In 1842 Professor Phrearris, of the University of Athens, published a slight account of the ruins in the *Néa Πανδώρα*,² interesting only as a proof that the destruction of later years had not then begun, — the seats of the theatre still being in perfect preservation.

The next account was printed by Mr. Pullan, in 1865, in a work which, so far as it refers to Assos, is a partial translation of Texier's text, illustrated by lithographic reproductions of the French engravings.³

Mr. Abbot, of the Foreign Office, visited Assos subsequently to Mr. Pullan; his admirable report has been recently printed.⁴

At the time of Mr. Abbot's visit, in November, 1864, a work of systematic destruction was going on. The Turkish Government were employing a considerable detachment of soldiers to displace and carry from the ruins the largest and

¹ This paper was considered worthy of translation and republication by German geographical journals.

² In the number of that Athenian periodical for February 1, 1862. The account was reviewed, and in part reprinted in the *Mittheilungen aus Justus Perthes' geographischer Anstalt, über wichtige neue Erforschungen auf dem Gesamtgebiete der Geographie*. Von Dr. A. Petermann. Gotha. 1862.

³ *The Principal Ruins of Asia Minor, illustrated and described*. By R. Popplewell Pullan. London. 1865.

⁴ *Handbook for Travellers for Turkey in Asia*. Fourth edition. London. 1878.

best hewn stones. The material thus obtained was shipped to Constantinople, and used, it is said, in the construction of the new docks of the Arsenal at Top-haneh.¹ The auditorium of the theatre, which less than twenty years ago remained almost uninjured, was by this vandalism transformed to an enormous quarry, the seats being piled one above another in indescribable confusion. The chief entrance gate of the city, one of the finest known monuments of Greek military architecture, — previously in such good preservation that it in no wise seemed a ruin, — was in part carried away, in part wantonly overthrown. Blocks spoken of as part of a Doric temple, which had long passed for that of Augustus, were at the time of Mr. Abbot's visit ranged side by side on the path leading to the sea, ready for shipment.

It appears from the present aspect of the site that this destruction was carried on for some months. The work was undertaken as though all the remains of the city were to be carried away; a road was built down the most regular declivity of the hill for the transport of the stones upon rough sledges, so that the making of a way for the reliefs taken from the Acropolis by the present expedition was greatly facilitated. The overthrow and removal of these stones must have been the most severe blow ever experienced by the ruins of Assos. The lime-burners of the Middle Ages had destroyed every vestige of marble to be found upon the surface; that the remaining monuments of volcanic stone should so very recently find a similar fate is indeed deplorable. The carved archi-

¹ The present writer has twice examined the arsenal docks, and indeed the entire water-front of Top-haneh, on one occasion in company with the geologist, Mr. Diller; but no blocks of the characteristic trachytes of Assos could be discovered. Most of the stone used in their construction is a grayish limestone, evidently taken from antique buildings, though not from any ruins of the Troad. If the material obtained from Assos found its way to Top-haneh at all, it must have been used for foundations beneath the water.

tectural fragments, which still thickly cover the city enclosure, only indicate the great relative wealth of the site.

The misfortune of Assos should stimulate archæological investigation in lands suffering under the Turkish Government. The insufficiency of previous investigations, like those of Texier, is keenly felt. Our knowledge of the remains at Paestum, for instance, or even at Athens, is already such that their total destruction could not wholly deprive us of their lessons. But in Assos, as in countless sites of Asia Minor, the case is otherwise; when their monuments have been so demolished that restoration is not possible, the loss to science is irreparable.

During the last season of Dr. Schliemann's excavations at Hissarlik, that energetic explorer, accompanied by Dr. Virchow,¹ visited Assos while on a journey through the Troad; and during the past year Dr. Schliemann again visited the site, to the pleasure of the agents of the Institute who were then engaged upon the preliminary survey.²

It was in June, 1879, that the present writer, with his companion, Mr. Francis Henry Bacon, visited the site for the purpose of investigating the remains of the temple of the Acropolis,—a monument of the greatest importance in the history of the Doric style. The observations made during a limited stay were presented, somewhat in the form of a review, in the First Annual Report of the Archæological Institute of America.³ The paper concluded with a recommendation of the site as a promising field for more extended investigations. There was indeed no reason to anticipate such brilliant discoveries of treasure as rewarded the excavators in Cyprus, at

¹ *Beiträge zur Landeskunde der Troas*, von Rudolph Virchow. *Aus den Abhandlungen der kgl. Akademie der Wissenschaften zu Berlin.* 1879.

² *Reise der Troas im Mai 1881.* Von Dr. Heinrich Schliemann. Mit einer Karte. Leipzig. 1881.

³ *Notes on Greek Shores* By Joseph Thacher Clarke. Pp. 145-163.

Hissarlik, or at Pergamon ; but though the prospect of such novel, and in great measure accidental, results was lacking from the outset, the important additions to our knowledge of antiquity made during the past year, and presented in the following Preliminary Report, cannot fail to be considered as eminently satisfactory.

The determination of the Institute to undertake the exploration of Assos was announced in the Second Annual Report,¹ in May, 1881 ; but the preparations had begun long previously.

Owing to the inclemency of the winter and early spring in the Troad, it was planned not to undertake active operations before the beginning of April ; and from the same consideration it was evident that excavations would have to be suspended by about the first of November. Nausiclides² remarked of the country of the Hellespont that "it had no spring and no friends," and although the reason he gave, — that no truffles were there found, and no fish of the kind called *γλαυκίσκος*, — may be deemed insufficient for such a depreciation, it is true that the Troad is much more inclement during the winter months than the neighboring islands of the Ægean, or the thickly settled tracts of the continent which border the Caicos or the Hermos. The different character of the winter in the Dardanelles and in Smyrna is surprising. The Troad is midway between the lands of soft Ionian skies, where secure from frost the pink blossoms of the almond appear during the first days of February, and those high and sterile plateaus of northern Asia Minor, where the winters last eight months, communica-

¹ *Second Annual Report of the Archaeological Institute of America.* Cambridge. 1881.

² In *Athenæus*, ii. 60.

tion is blocked for weeks by snow-drifts, and even parts of the great salt Pontos are covered with ice. The little river Touzla,¹ which flows by Behràm, always freezes in December and January ; and even the swift waters of the Mendereh² are covered with ice so thick as to bear a horse and rider. In the ancient Greek bridge, which forms one of the most interesting discoveries of the past year, the piers are formed of courses of stones, ingeniously notched and bonded so as to resist the shock and lateral pressure of the ice after the breaking up of the frozen sheet. The heavy rains of November frequently filled up the trial pits and trenches in a few hours, and there was snow upon the bleak range of Ida after the survey had begun in April.

Although Assos is only two degrees of latitude farther north than Olympia, the plan of the German explorers in the Altis had to be reversed,—the campaign being carried on throughout the summer, and all work suspended during the winter months.

The organization of the party occupied the last months of 1880. The names and qualifications of the gentlemen chosen from the many applicants were published in the before mentioned Report of the Institute. Those actually present upon the site from time to time during the year, beside the writer, were Francis Henry Bacon, Howard Walker, and Maxwell Wrigley, architects ; William Cranston Lawton and Charles Wesley Bradley, graduates of Harvard College ; J. H. Haynes, graduate of Williams College ; and J. S. Diller, geologist.³ The pioneers left America during January, to spend February in preparatory study in the British Museum, and in examining and redrawing the sculptures from Assos in the Louvre.

¹ The ancient Satnioeis.

² The ancient Scamander.

³ Mr. Edward Robinson remained at Mytilene ; Mr. Eliot Norton was at Assos, as a volunteer assistant, from March to June.

A library of some four hundred volumes of reference, contributed by various members of the party, cot-beds, bedding, etc., and a supply of canned food were sent from America. An excellent transit-instrument had been placed at the service of the expedition by Professor N. S. Shaler. There still remained to be procured in London a level, telemetre rods, chains, etc., with other surveying instruments and drawing materials.

The acquisition of a photographic camera had not at this time been determined upon. When, in the month of June, it became possible for the expedition to employ and purchase apparatus and chemicals for taking photographs, an outfit was ordered from England through an expert. Unfortunately the instruments did not reach Mytilene until the end of November, after the work at Assos had ceased for the year.

The difficulty experienced in introducing the goods of the expedition into Turkish territory will illustrate one of the many obstacles attending every undertaking subject to that Government,—obstacles which, greater even than their notoriety, have been responsible for many vexatious delays of the work.

It is a peculiarity of the Turkish laws relating to custom-duties that a re-examination and taxation is enforced when goods are transferred from port to port of the empire itself, however near these may be one to the other. Hence the great number of camels in a mountainous country, destitute of roads, which is by nature unfavorable to the extensive employment of beasts of burden. If the sacks of valonia stored at Behràm were to be carried to Babà-calessi by water, that they might be exported by steamer, they would be subjected to an additional revision and duty; while upon the land there of course exist no custom frontiers. Instead of the easy voyage of two hours, the merchants in order to avoid the

duty would be obliged to carry their bulky merchandise over a rugged plateau, by a path which, though winding so as to make the distance half as far again as the coast line, rises, near Arablâr, to a height of nearly five hundred metres. It is natural that in the face of such difficulties every insignificant landing-place conveys the products of its vicinity directly to Smyrna,—the slow and difficult voyages of the small coasting vessels thus employed unfavorably affecting the development of commercial resources on an adequate scale. The failure of the Austrian steamers to maintain a communication with Babà-calessi, before referred to, was more owing to this hindrance of trade than to any absolute unproductiveness of the Southern Troad.

On arriving at Smyrna, the goods of the expedition, as consisting solely of scientific instruments and personal property not intended for sale, were permitted to enter the country free of duty, after the opening of every package and the payment of heavy incidental fees. As all means of farther transportation directly to Behrâm were lacking, it was necessary to re-ship the property to Mytilene. After a constant attendance upon the officials at Smyrna for nearly a week, a *teskerèh*, or grant of free entrance to Mytilene and Behrâm, was procured. On arrival at the island an objection was made to some irregularity of form in the document, which was in fact a pretext to enforce, by the delay of two weeks necessary for return mails, the payment of the eight per cent *ad valorem* levied as entrance duty upon all merchandise. This was at a time—the 9th of April—when great despatch was requisite in order to bring the surveying instruments into the field, and the present consular agent of the United States at Mytilene, Mr. Phottion, gave a personal bond that the answer expected from the chief of the custom district at Smyrna would bear out our assurance that the goods had been de-

clared wholly free of duty. After a second examination we were permitted to remove the cases from bond to the temporary quarters of the Expedition, where they were unpacked.

The surveying instruments were soon after carried in a small sail-boat to Assos, and the actual work upon the site began upon the 19th of April.

When the agents of the Institute were believed to be thus out of reach, the custom officials of Mytilene made immediate and unceremonious demand for the sum which could be levied upon the cases that passed through their hands, by estimating their value at an excessive rate. In the absence of all expeditious communication with Behràm, there seemed to be no possibility of evasion on the part of the bondsman. But, unfortunately for this well-conceived plan, it so happened that the writer, unknown to the officials, had returned immediately from the site to Smyrna on other business, and on receiving telegraphic news from Mr. Phottion, was enabled to protest against payment, pending the obtainment, by a further expense of time and money, of a direct order and reprimand from the Smyrna headquarters. The friendly assistance of Consul B. O. Duncan was efficient in this as in other junctures.

During a preliminary visit to Assos no available dwelling for the party could be found, either in the squalid village above or in the four buildings at the foot of the cliff. It was hence not advisable to transport at once the whole outfit of the expedition from Mytilene to Behràm. To keep up a communication between the two places until it might prove possible to settle definitely at Assos, a row-boat was bought in Smyrna, towed to Mytilene, and there rigged with sails. It was not until the middle of May that two large rooms could be secured in the chief valonia magazine at the port. In the meantime the first comers slept and stored the instruments in

a room in the granary of a kindly disposed Greek merchant, K. Agichristo, to whom the members of the Expedition owe many subsequent favors. Much time was at first lost by the many voyages to and from Mytilene, distant about forty-eight kilometres from Assos. The passage became more and more difficult as the season advanced, owing to the prevalent and increasing northerly winds, — the Etesians of the ancients,¹ — which blow during the whole summer. On the 27th of July all connection with the island was severed.

The survey was by this time well advanced. A base line of five hundred metres, running from east to west, had been accurately measured in the river valley upon a sandy reach; and another, from north to south, was laid out on the street of tombs, — the only tract of the high land intervening between the stream and the sea where so long a level could be found. From the stations thus fixed the triangulation advanced, the calculations being constantly compared with direct measurements. The rugged character of the ground rendered the choice of stations difficult, and greatly increased their number, — it frequently being necessary independently to determine points distant but a few metres in plan.

The only interference offered by the inhabitants, to whom of course such a survey was incomprehensible and suspicious, was the systematic destruction of station pegs, which were almost always pulled up during the night. Recourse was had to engraved marks upon stones, so heavy as not to be easily displaced. The complex triangulation being thrice repeated, the map may be relied upon as accurate.

The transit employed was, if anything, too delicate and

¹ The great importance of these winds upon the development of the lands bordering the northeastern Mediterranean can hardly be appreciated by those who have never lived in the Levant. A pleasant characterization of the Etesians is given by Curtius, in his *Griechische Geschichte*, bd. i. cap. i.

cumbrous for field work. It was otherwise with the light levelling instrument, which suffered severely from once being overthrown by the wind. The exact determination of the various heights, and the final decision of the question concerning the curvatures of the temple stylobate, to be referred to below, have thus to be reserved for the second year's work.

An even greater part of the preliminary investigation than the survey consisted in a thorough examination of the ruins remaining above ground,—the purpose and relation of the hewn stones gradually becoming evident by continued study and comparison of the confused heaps of rubbish.

With the gradual completion of this work the impatience of the explorers increased for the long-promised *caradeh*,¹ or official grant, which was to allow the commencement of digging. Permission to undertake investigations at Assos had been definitely granted to the Archæological Institute of America by the Porte, through the Turkish Minister of Public Instruction, as early as the autumn of 1880. A further assurance that the document setting forth the right of excavation was at the immediate disposition of the agents had been required and received before the departure of any members of the Expedition from America. But notwithstanding repeated requests made during the winter by the American Legation in Constantinople, and even a vigorously worded note from the Secretary of State, the *caradeh* was not forthcoming until far into the summer,—months after the explorers were on the site. And before digging could be begun under its sanction, the document had to be presented in due form to

¹ An *caradeh* is a document given by one of the ministers of the Turkish Government, as distinguished from a *firmân*, which is a grant dependent ultimately upon the Sultan. A request to undertake excavations, like all other matters concerning the antiquities of the Ottoman Empire, is referred to the Ministry of Public Instruction.

the Pasha of the Dardanelles, as governor of the district in which Behràm is situated, and to the Kymacàhm of Iradjik, as the nearest local authority.

Before these formalities had been fulfilled, even the survey was liable to interruption. Indeed, any appearance of the explorers upon the site before being in possession of the *caradch* was discouraged by a number of residents long familiar with the usages of the Turkish Levant. But extreme care was taken to avoid all display and intrusion upon the villagers; and by the time the official permission to excavate arrived at Assos, the greater part of the preliminary investigations had been accomplished.

The excuses advanced to account for this delay in granting a document promised to the official representatives of the United States by the Turkish Government, day by day for six months, are so characteristic as to deserve notice. Behràm, it was said, was situated in the Vilayet of Broussa, and the governor of that province was cited as being strenuously opposed to the undertaking, by foreigners, of any archæological researches within his jurisdiction. He was reported to have thrown all manner of difficulties in the way, — averring that the roads were impassable, and that commissioners were unable to proceed from Broussa to Behràm to ascertain whether public or private interests were liable to be interfered with by the proposed diggings in the vicinity, etc. While plans were being matured to overcome this opposition, a remarkable telegram from the Sublime Porte was received at the Conac of Midhat Pasha, inquiring if the village of Behràm were not under his jurisdiction, and in the Vilayet of Smyrna. It thereupon appeared that the site was not, and never had been, comprised in the province of Broussa, but, like Chanàc,¹ the

¹ The city of the Dardanelles; situated somewhat to the southwest of the ancient Abydos (Point Nagara).

chief town of the district, was directly dependent upon Constantinople.¹

The Governor of Broussa, whose opposition had been so determined, and against whose will it had seemed so inadvisable to the Porte to grant an *caradch*, had nothing whatever to do with the matter, and in all probability had never even heard of it. After the exposition of these facts further evasions were not attempted. The permission to excavate was at last granted.

Another hindrance to the advance of the investigations, severely felt during the summer months, was the shipwreck of the vessel which had on board the household outfit of the party. Having left Boston at the end of January, the barque "Fame" discharged her cargo upon St. Thomas, to which island she had been driven from her direct course to Smyrna. The goods of the Expedition not spoiled by salt water were reshipped, but did not reach Smyrna until the end of June. The presence of an agent of the Institute was required there to attend to the legal determination of the general average necessary before the goods could be unloaded, to conduct similar troublesome negotiations with the customs officials to those described above, and to forward the cases, obtained after great delay, to Behràm.

In returning from this unpleasant detention the writer was enabled, by the hospitality of his friend Dr. Carl Humann, to study in Pergamon the various methods of excavation which had been proved by long experience to be best adapted to the peculiarities of the country. The Expedition is under great obligations to Dr. Humann for his effective furtherance of the work by sending to Assos, at a later date, a small body of picked men who had been in his service since the first

¹ The division of the Vilayets of Asia Minor is evident from any good map; as, for instance, from Kiepert's well-known General Chart of the Turkish Empire.

brilliant success of the excavations at Pergamon, by his liberal transfer of tools adapted to the usage of the laborers, which those brought from London were found not to be, and by the loan of a powerful winch.

By the first of August all preparations for digging had been made, and all requisite formalities complied with ; on the sixth, the work at last began. It was at first difficult to obtain laborers on account of the scanty population of the land and the inhospitable character of the little village. The natives, moreover, are indolent. A well-known Ottoman proverb affirms, that "it is better to serve without pay than to stroll without purpose ;" but most of the Turks in the Southern Troad are evidently of the opinion that absolute idleness is preferable to either. Those of the hundred and fifty male inhabitants of Behràm who are willing to work at all are busied in the grain-fields bordering the Touzla, or follow their restless goats over the neighboring mountains in search of verdure.

The first laborers to arrive upon the site were Greek quarrymen from Stypsis, a village upon the slopes of Mount Elias,¹ near the northern coast of Mytilene. Later on came Greeks from Ivalee, from the villages on the north of the Adramytian Gulf, and from various parts of the island of Mytilene. Those who had served at Pergamon were natives of Lemnos. Greeks and Turks were employed side by side, working in perfect harmony, and even with some spirit of emulation.

The Fast of Ramazàn, which occurred during August, deprived us of the services of nearly all the Moslems. As during that month no believer may touch food or drink from sunrise to sunset, the Turks are wholly unfitted for severe or continued exertion.² When the night is occupied in eating, drinking,

¹ The ancient Mount Lepethymnos.

² The strict observance of the Ramazàn is particularly severe upon the lower

and mutual congratulations that the long hours of privation are over, the day can be spent only in sleep and inaction. On the conclusion of this distressing period, however, the Turks of neighboring villages came in numbers to be engaged on the excavations, and were particularly valuable as forming a link between ourselves and the inhabitants of the vicinity, — to explore which was among the purposes of the Expedition.

As a general rule the Greek proved a more diligent and intelligent laborer than the Turk. There were, however, noteworthy exceptions in favor of the Moslems, especially in the case of some discharged soldiers, who had been subjected to the privations and discipline of late campaigns.

The men were paid at the uniform rate of one-half a medjid (about forty-one cents) a day. This sum is a trifle larger than the average given to navvies upon the Smyrna railroads; but it was found that the best workmen, when employed at graded wages, were in the end the cheapest, and the comparatively small staff needed at Assos was made efficient and trustworthy by weeding out all but capable and diligent men.

The number of laborers employed never exceeded thirty-five, averaging about twenty-six during the last half of the work. The hours of labor were from half-past five in the morning until the same time in the afternoon, including two hours' recess, — a half-hour for breakfast, and one and a half hours at noon. A short siesta at the time of the sun's greatest blaze seems to be a necessity of the climate. The duty of the superintendent, beside the oversight of the trenches, com-

classes when it occurs during the summer, the long parching days provoking intolerable thirst, and the least exertion in the fields causing exhaustion. The lunar month devoted to the Fast naturally occurs in every season of the year during the course of thirty years. Its effect upon land and people is pitiable; it is astonishing that human beings can subject themselves to such abstinence. The precepts of the Fast are carried out in the austere Troad with scrupulous fidelity. As the Turkish word for smoking unfortunately signifies "to *drink* smoke," the believers are deprived even of that incomparable solace.

prised the economy of the laboring forces. The proportion of pickaxes, shovels, and wheelbarrows in use varied from day to day according to the nature of the ground, and much depended upon a wise adjustment. Though the exertion of the pickers in the stony earth was greater than that of the other laborers, their task was for some reason considered to be more honorable; and the older and better men were not easily induced to handle a shovel, much less to trundle a barrow. An *esprit-de-corps*, a spirit to which the modern Greeks greatly owe their advance, was soon developed, resulting in a system which otherwise it would have been difficult to introduce, and impossible to maintain. Under its influence the independence and marked individuality of the laborers proved to be decidedly favorable to the work. Quarrels and drunkenness were unknown.

It is the custom in the Levant that large bodies of laborers should be abundantly supplied with drinking-water by the contractor. As all the trickling springs of the village cease to flow by July, the supply had to be brought from the half-stagnant river below in large earthen jars slung upon either side of an ass, much like the *amphoræ nasiternæ* of the ancients.

The food of the men was that which has supported the working classes of the land from the earliest ages of Hellenic civilization. Bread was prepared by the Greek baker of the port in the same manner, and the loaves were of the same shape as in the fifth century, B. C. White goat's-cheese and onions, or leeks, were eaten with it, — *ἄλφιτα, ὄψον δὲ κρόμυα καὶ τυρόν*,¹ — while the rich black olives, — *ρύσαι καὶ δρυπεπεῖς*,² — so preferable to the green fruit exported to northern lands, took the place of meat.

¹ Plutarch: *On the Glory of the Athenians in War and Wisdom*, § vi.

² Athenæus, ii. 56, and iv. 137.

The food supplied by Behràm and its vicinity is scanty and monotonous. Beside fowls the only meat obtainable is the stringy flesh of goats, and occasionally mutton ; no vegetables whatever are grown, with the exception of onions, tasteless gourds, and the so-called *dolmas*, or *meljinas* (*Solanum melongena* L.), in appearance similar to our egg-plants, but immeasurably inferior. Fine figs are grown in the few valleys where the burning sun does not parch the scanty soil, but these and pomegranates are the only fruit. Goat's-milk is seldom to be had fresh, the most rational manner of eating it in this climate being in a curdled condition (yaoùrt), or made into an acrid, chalk-like cheese. Of fish, cuttle-fish, and octopods there is, however, an abundance ; and the bread baked by the natives is excellent. We could not accustom ourselves to the snails and sea-urchins eagerly sought by the workmen during holidays. Wild honey was occasionally brought from the neighborhood, and reminded us of the appearance of the bee upon the coins of the ancient city.¹

The Greek islanders appear to have retained more Hellenic characteristics than the inhabitants of the Morea, and their modes of life, in primitive simplicity, present in many ways a commentary upon the usages of the ancients. The most radical change has of course resulted from their Christianization. During August and September, four holidays of Greek saints interrupted the work. A further disturbance was caused by the heavy rains of October, three week-days being lost on that account during the first half of the month.

The heat of the midsummer sun, reflected by the sea upon the southern slopes of the arid volcanic cliffs, was intense. As there are no marshes, there is no malaria at the rocky port or at the village of Behràm ; but so great werè the heat and fatigue that only one of the eight Americans who were at the

¹ Sestini: *Lettere numismatiche . . . continuazione*, part. viii. p. 33.

site from time to time during the summer wholly escaped from fever.

The laborers gradually deserted the work with the advancing season, until on the first of November hardly one-third of the entire number remained. Till the end of September the men had slept in the open air, upon the flat housetops. The interiors of the coffee-houses and khans were, it is true, uninviting dormitories, but the continued exposure in a climate more rigorous than that of Mytilene caused much suffering from colds and rheumatism.

The first digging in the soil of Assos for the purpose of archæological investigation was on the summit of the Acropolis. The prospecting trench struck immediately upon the steps of the archaic temple, which once crowned the great natural altar. Neither walls nor columns remained in position to mark the site, and the earth which hid the foundations had accumulated to a depth averaging one and a half metres. The first adequate description of Assos published, that of Dr. Hunt,¹ remarks that of the "temple which stood on the citadel, parts of the shafts remain on their original site, so that a person conversant with ancient architecture might easily trace the plan and different details." Texier, on the other hand, describes the summit of the Acropolis as covered at the time of his visit with "*grandes constructions militaires modernes*." It thus appears that the final levelling of the ruins took place during the first third of this century (1801-1835), and the accumulation of débris must, in the main, date from that time. The comparatively recent removal of the lower parts of the columns from their original positions is evident from the fact that the channelled blocks, roughly built into the Turkish walls marked *FF* upon the plan, Plate 2,² on the

¹ Page 126 of the work referred to above.

² The topographical sketch, Plate 2, exhibits the condition of the Acropolis



PLATE 2

south and west of the citadel, are almost exclusively *lower* drums.

It is possible that the uprising of the Greeks in their struggle for independence may have led to the construction of the Turkish fortification, the recent date of which is proved by its irregularity and the entire lack of the mortar which was lavishly used in mediæval masonry. The lime-kilns had exhausted such marble as was to be found upon the site before the present century. Behrâm, it is true, could never have been directly exposed to a concerted attack of the insurgents; but the proximity of the island of Mytilene, with its predominant Greek population, may reasonably have induced the Turks to erect defensive works on the strongest natural fortress of the Southern Troad.

The upper part of the columns must have been overthrown and rolled down the steep sides of the Acropolis at a time when the stumps of the shafts were still standing. Several of the smaller drums were dug out from the reservoir before the stoa; others, hollowed at one end, have long served the

upon the termination of the year's digging. The walls in black are mediæval, and remain to a height of at least three metres above the ground.

AA Cemented wall, in which the fragments of the sphinxes from the eastern front of the temple were found.

B Position of the bowman relief when discovered.

C Position of the relief of the three centaurs fitting upon the bowman.

D Position of the unbroken metope.

E Position of the sphinx from the western front, found upon the surface, and apparently overlooked by the French in 1838.

FF Turkish walls, built without mortar, and containing many blocks of the temple.

GG Towers and magazines of late rubble masonry.

HH Remains of early fortification walls of carefully jointed polygonal masonry.

YY Capitals placed upon edge as a rampart.

KK Pits and trenches dug by the Expedition.

L M O P Chutes used in the removal of earth.

N Position in which the relief of the lion and boar, and the hind quarters of the lion were found.

inhabitants of the village as mortars for crushing coffee. The cella wall, of which not a block is recognizable, was probably removed at a far earlier period by builders covetous of its evenly squared stones. The skeleton of columns and entablature may then have stood in much the same condition as those of the temples of Segesta and Aegina.

The soil which buried the temple foundations contained no ancient coins, and had evidently collected during the recent occupation of the summit by Turkish constructions. It was traversed by a complex of roughly built walls, piled up of small stones without mortar, — in every way similar to those of the neighboring village huts. No blocks of the temple superstructure remained upon the stylobate.

The entire exposure of the foundations was at once undertaken. A steep slope upon the east of the Acropolis was examined; and as no antique remains of importance were found to exist upon the native rock, the earth carried off in wheelbarrows was thrown over that brink, *L*, Plate 2. As the work advanced, a second chute, *M*, was prepared upon the western side.

None of the sculptured epistyle blocks, which we eagerly desired to find, were met with during this digging; but there was much interest in tracing the plan of the building as it emerged from the débris which so long had covered it. To preserve from injury the upper surfaces of the stylobate and pavements, a layer of earth a few centimetres thick was left upon them until the very last, — thus preventing all scratching and chipping by the iron wheels of the barrows.

When all was swept and the blocks carefully washed, the position of eighteen of the pteroma and two of the pronaos columns became evident by the slight weathering of the stylobate surface which had occurred while the blocks were still in place. The almost microscopical traces left by some of

the shafts only displayed the outline of the channellings by the sharp side-light of the rising or setting sun in a cloudless sky.

The effect of the rain upon the stucco priming, undoubtedly once employed throughout the structure, was evident from the grayish discolorations of those joints and clefts into which the lime was precipitated. The clouds of sharp volcanic dust driven upon the building by the north winds have not been without effect; the surfaces once protected, like the stand-points of the columns, appearing slightly in relief when investigated by an artificial flame on still, dark nights. By the diffused light of day these infinitesimal projections were not visible. The coarse material of which the temple was built was, however, not favorable to the preservation of delicate indications of this nature.

The site of the cella walls was recognized by the delicate incised lines traced by the Greek master-builder upon the stones of the stylobate, to mark the position of the first upright blocks. Upon either end of the building pits were sunk to the native rock to study the lower courses of the stereobate, and in places where the pavement of the pteroma was broken away its bedding was similarly examined. A detailed account of the results thus obtained is reserved for later pages of this Report.

Some of the marks made upon the temple plan after the destruction of the cella walls and roof are of a curious interest. Upon the pavement of the northern pteroma there is the trace of an exploded shell, which is hard to account for, since the last signal struggle known to have affected Assos—namely, the invasion of the Southern Troad by Orkhan and his emirs—was before the introduction of cannon. Upon the foundation stone at the southwestern corner of the cella wall the peculiar squares necessary for the old game of morris

were found deeply engraved. Near the temple at a considerable depth a number of hand-stones for grinding wheat were unearthed and carried off with delight by one of the old men of Behràm, who put them at once into the primitive service for which they had been prepared centuries before.

As before said, no coins older than the last century were met with in uncovering the stylobate ; but in trenches dug in other parts of the Acropolis and on the levels of the lower temple-steps various Byzantine moneys indicated the relation of the different strata, and illustrated the gradual advance of the destruction. The only coin of precious metal, an electron of the reign of Michael VIII. (Palacologos) — 1261–1282 A. D. — was found within the citadel enclosure, north of the temple.

That coins or ornaments of precious metal would be secreted by the laborers, notwithstanding the constant supervision, was naturally to be assumed in view of the notorious tendencies of modern Greeks. To obviate so far as possible the chance of such a loss to the investigations, the intrinsic value of every piece of gold or silver was offered as a premium to the finder, in addition to his regular wages. By this arrangement little was to be gained by theft from the trenches.

The reliefs from the temple, the discovery of which, together with the stylobate, form the most important result of the year's work, were chiefly found in the lower courses of the fortification masonry which enclosed the inner citadel. The blocks of the sculptured epistyle and the metopes remaining above ground were, as already mentioned, removed to Paris in 1838. From the accounts given by Hunt, Richter, Prokesch von Osten, and Fellows, it appears that these reliefs, with few exceptions, lay scattered upon the southwestern slope of the Acropolis, where they had evidently been thrown on the destruction of the late ramparts in which they previously had been embodied. The descriptions of

these travellers were fully borne out by the interesting testimony of one of the old men of Behràm, who remembers when a youth to have seen the sculptured blocks lying upon the surface, and to have watched the operations of the sailors in carrying them to the sea-shore.

The search of the French was thorough. Only one fragment was found by the present Expedition upon the declivity; namely, the second sphinx from the western front, which lay face downward at the spot marked *E*, Plate 2. This block, though overlooked by Raoul Rochette, may have been seen by Texier, who in his restoration correctly drew the shaft upon which the fore-paws of the recumbent animals are supported, — a feature not evident from any of the reliefs in the Louvre. As will be seen in the detailed consideration of the sculptures, this sphinx accurately fits upon its mate now in Paris, and could not have been purposely left behind.

The two blocks forming the far more beautiful sphinxes of the eastern front were found in the wall, *AA*, at the north-west of the Acropolis. This mass of masonry, from its relation in plan and bonding to a Turkish semicircular tower abutting upon it, as well as from the employment of mortar in its more careful construction, is proved to be of comparatively early date. The lime which covered and preserved the features of the archaic heads had become so hard that the stones could only be loosened from their beds by iron wedges and sledge-hammers. The broken metope and the small fragment on which were the front legs of a centaur were found in the vicinity.

The two important blocks of the bowman and centaurs, the most valuable discovery of the year, were met with late in the season, in the foundations of the rampart at the southwestern angle of the citadel. They were not embedded in mortar, and were lying near each other at a depth of 1.5 metres below the

present surface of the earth. The lion and boar relief and the hind-quarters of a lion were similarly situated near the western steps of the temple, *N*.

The complete metope did not form part of the enclosing wall, but lay buried in the accumulated soil at the north-east, *D*.

Prokesch von Osten mentions, among the sculptured blocks remaining upon the surface at the time of his visit in the year 1826, a metope with a figure of "Amor, seated and holding a bow," — more probably the archer of Heracles. This relief was not taken to Paris, but though the most careful search was made it could not be found.¹

The peculiarity of the lateral blocks of the triple epistyle, — the step upon the back, — made them readily recognizable while only partly exposed; and it was with almost feverish anticipation that stones of this shape were turned over. The proportion of plain blocks was great, both among the lintels, — of which a considerable length had been taken from the site, while all the unsculptured inner epistyle remained, — and among the metopes, of which only those upon the fronts appear to have been decorated. The delight of discovery was less frequent than the check of disappointment.

A terra-cotta antefix was found in a crevice at the south-eastern corner, deeply buried, as it must have been one of the first parts of the temple to be overthrown, — if, indeed, the archaic roof-tiling to which it appertained was not replaced by a restoration during the flourishing ages of the city. The lion's head from the corner gutter lay in the deep soil at the north of the temple.

During a great part of August the work of digging upon the Acropolis was impeded and made unpleasant by the high

¹ This block is particularly described in the Wiener *Jahrbuch*, 1832, ii. *Anzeiger*, p. 59.



north winds,—the Etesians already mentioned. The wind was so heavy at times as to render it difficult to stand upright upon the walls of the exposed summit, where any disturbance of the dry soil by pick or shovel raised blinding clouds of sand and lime-dust into the air. The men made wary by experience at Pergamon had provided themselves with spectacles of gauze; the less fortunate raw hands wept painfully, and aggravated the ill by rubbing their eyes with gritty sleeves. The distress was sufficient to reduce the number of laborers; and it was a relief when, by the end of August, material had been obtained for preliminary study, and the work could be temporarily transferred to the sheltered southern slopes of the lower town.

Little earth had accumulated upon the commanding terrace before the stoa. The bowlders and débris washed down from the heights above had formed a slide across the colonnade, almost wholly filling up the great basin in front of it, but thus caught as by a moat, left the open place almost bare. The general arrangement of the long colonnade remained so plainly evident that even an unscientific traveller could comprehend from the ruins the appearance of the original structure.

Although the broad flight of steps which must have served as an ascent from the theatre, the parapet, and in places parts of the terrace itself, are missing, yet the general disposition of the public buildings in the vicinity could be determined with no great difficulty. Compare Plate 3.¹

¹ The topographical sketch, Plate 3, exhibits the condition of the stoa, theatre, and adjacent buildings upon the termination of the preliminary excavations made during the year. The walls in black are antique, and, with exception of those of the theatre scene and of the building at *Z*, remain nearly to their original height. The trial pits and trenches dug by the Expedition are designated by asterisks.

A A Narrow subterranean passage leading to the stoa plateau.

B Steps in position.

C Fountain niche, before which is the vaulted cistern of accurately jointed polygonal masonry.

The first trial pits revealed the arrangement of the entrance to the stoa, showing the parapet between the columns upon the extreme east and the end wall. Trenches were dug through the mass of earth and stones which filled the hall, and the lower drums of the inner range of columns were found to be still in position. Several shafts were sunk to the bottom of the great reservoir, exposing its accurately jointed pavement. Its basin was in great part filled with the blocks of the colonnade and of the buildings which once stood upon a higher level. Even drums from the summit of the Acropolis were found here, as has been before mentioned. Near its western end were the outlet and conduit, which led the water from it to a lower basin upon the level of the terrace *Q Q*, Plate 3. The stone channel was in admirable preservation, even the water-box and lead-pipe of a late Byzantine restoration remaining undisturbed.

In connection with this work a preliminary examination was made of the rectangular foundations at the west, and of

- D D* Stone lintels forming the ceiling of the subterranean passage. Broken, but in position.
- E E* Mediæval walls, thoroughly excavated. Among these ruins were found the bronze inscribed tablet and marble inscriptions.
- F F* Columns in position.
- G G* Vaults, of Roman or Byzantine period.
- H H* Modern Turkish enclosing walls.
- J J* Doorway jambs in position.
- K K* Subterranean vaulted chambers beneath either end of the theatre auditory.
- L L* Balustrade of orchestra, and lower seats in position.
- M* Remains of wall and gateway.
- N* Ruins of a building restored by Texier as a "Nymphæum."
- O O* Turkish enclosures used as goat-pens.
- P P* Pavement of the place before the stoa in position.
- Q Q* Subterranean water conduit, leading to the lower terrace.
- R R* Greek retaining walls of heavy masonry.
- S* Greek foundation wall, with water-pipes.
- T* Foundations of a rectangular building, possibly a temple.
- U* Mediæval remains on Greek foundations.
- V* Ruins of a Byzantine church.

the considerable remains of a building at the east, of the great public place. Trenches determined the position of the walls, and the general plan of these structures; but the limited excavations could do no more than reconnoitre the field. No carved fragments or inscriptions were met with upon the terrace itself; but on digging at a lower level upon the east, among the mediæval walls *EE*, the débris was found to contain important antique remains. A number of inscriptions came to light which must originally have stood as upright slabs on the pedestals of trachyte still remaining upon the parapet above.

Thus encouraged, we had all the earth lodged in the angle formed by this lower terrace removed, and the subterranean passage leading to the place before the portico freed from débris. The ceiling beams of this passage had been broken, and, falling in, had filled the space with their fragments; the bearings, however, remained in position upon the lateral walls, illustrating the peculiar notched system of their jointing. The steps at the eastern end apparently owe their present awkward arrangement to a Christian reconstruction.

Close to the lower entrance, at *C*, Plate 3, there was found to have been an important fountain, probably supplied from the great reservoir before the stoa, and standing in immediate connection with a vaulted cistern. The marble slab and trough which once filled the niche had disappeared, only small fragments of the latter being recognizable among the rubbish in the vicinity; but the general arrangement of the water-works could be easily traced.

The cistern, as will be seen, is remarkable for the accuracy of its polygonal masonry as well as for certain peculiarities of plan. Some six or seven metres below the surface, the earth with which it had partly been filled was found to contain some fragments of inscriptions and various water-jugs of Byzantine

form. Upon the southern side of the passage late walls, *E E*, had been built against its enclosure. Among their ruins were found all the inscriptions published in the present Report, and a considerable number of fragments which it is hoped to complete by excavations upon a still lower level. Nearly all the marbles had been shattered by their fall from the parapet before the portico.

The inscribed bronze tablet appears to have owed its exceptional preservation to long service as a fire-back, of which it bears traces ; the intrinsic value of so large and thick a sheet of metal would otherwise have led to its destruction.

The badly-built mediæval walls had been thickly plastered, and in many places a debased painted decoration was distinct upon them. The various enclosures were without doubt at some time occupied as houses and shops, the last inhabitants of the southern town naturally retreating to the sheltered slopes near the great public place.

As indicated by Mr. Abbot's account of Assos, written at the time of the systematic removal of hewn stones from the site, that work of destruction nowhere produced more lamentable results than in the theatre. In place of the almost perfect monument seen by previous travellers, there now remains little more than a hollow in the steep hill-side. The upper seats have been torn away, the lower are covered with rubbish. The orchestra is filled with earth ; of the stage only the lower walls exist.

Prospecting trenches uncovered the seats for several tiers above the balustrade which separated the spectators from the orchestra. The foundations of the scene were also followed out. Here the débris had accumulated to a depth of more than two metres, the space having been used during the Middle Ages for dwellings, as was evident from the remains of household fires, the bones and tusks of wild boars, shards of

barbarous kitchen utensils, etc. Of the pavement of the orchestra no traces whatever could be found. The only decorative sculpture met with was a Hermes upon the western termination of the balustrade.

In connection with these preliminary studies at the stoa and theatre, some attention was devoted to the great structural masses in the vicinity. A number of pits were dug upon the lower terrace in front of the western half of the stoa plateau. The walls of a Christian church, *V*, had made it evident before the beginning of the excavations that the later Byzantine occupation had greatly altered the level of this terrace and the plans of the buildings upon it. A little digging showed that a thorough removal of the considerable accumulation of earth would be necessary before any adequate understanding of the complex constructions could be obtained. At a depth of from two to four metres the pits revealed antique pavements, water-pipes, foundation walls, and even the bases of columns in position, — the further investigation of which, on account of the extent of the work, we found ourselves obliged to reserve for another year.

The case was similar with the interesting remains of a portal, *M*, belonging to a building at the extreme east of the upper plateau. The massive lintel blocks, fallen from their position, were not to be moved without the help of the winch, which did not arrive until after the completion of the work at this point.

The ruins of an enclosure of considerable extent, within the city walls and at the southwest of the Acropolis, attracted the attention of several of the earlier travellers, — notably of Prokesch von Osten, to whom we owe an admirable description of the state of these remains at the time of his visit. A fragmentary inscription upon the epistyle blocks of a sur-

rounding colonnade, published by Richter,¹ has led to the supposition that the edifice was dedicated to Augustus, and even that it was a temple to that deified monarch. Though its real character is still far from certain, the building will be referred to as a gymnasium in the present Report, some of its features indicating this designation.

The outline of a polygonal apse was plainly visible above the ground, by the side of the footpath which leads from the village to the sea. (Compare Plate 4.) Within this the accumulated soil proved to be a little more than one metre in depth, while outside the pavement of the street was not reached until seven metres below the surface. This made it clear that the building bordered, toward the south, upon the parapet of a terrace, and lent weight to the supposition that the portico observable upon the principal thoroughfare of the city stood in connection with its inner court, notwithstanding the great difference in level.

Both apse and portico were freed from earth. Within the enclosure trial pits determined the position of the gate of the gymnasium at the northwest, and of one column of the more important portal at the northeast. A marble stylobate and the carefully jointed slabs of a broad pavement were found within the colonnade, which extended at least upon the northern half of the rectangle. One shaft remained in position, and additional epistyle blocks, bearing the carefully cut letters of the inscription before referred to, were found at no great depth.

Near the marble steps were various remains belonging to a monument of small dimensions and lavish Diadochian ornamentation,—the marble gutters carved with lions' heads,

¹ More generally accessible in Boeckh, *Corpus Inscriptionum Græcarum*, No. 3569. The inscription will be referred to at greater length in the description of the building itself.

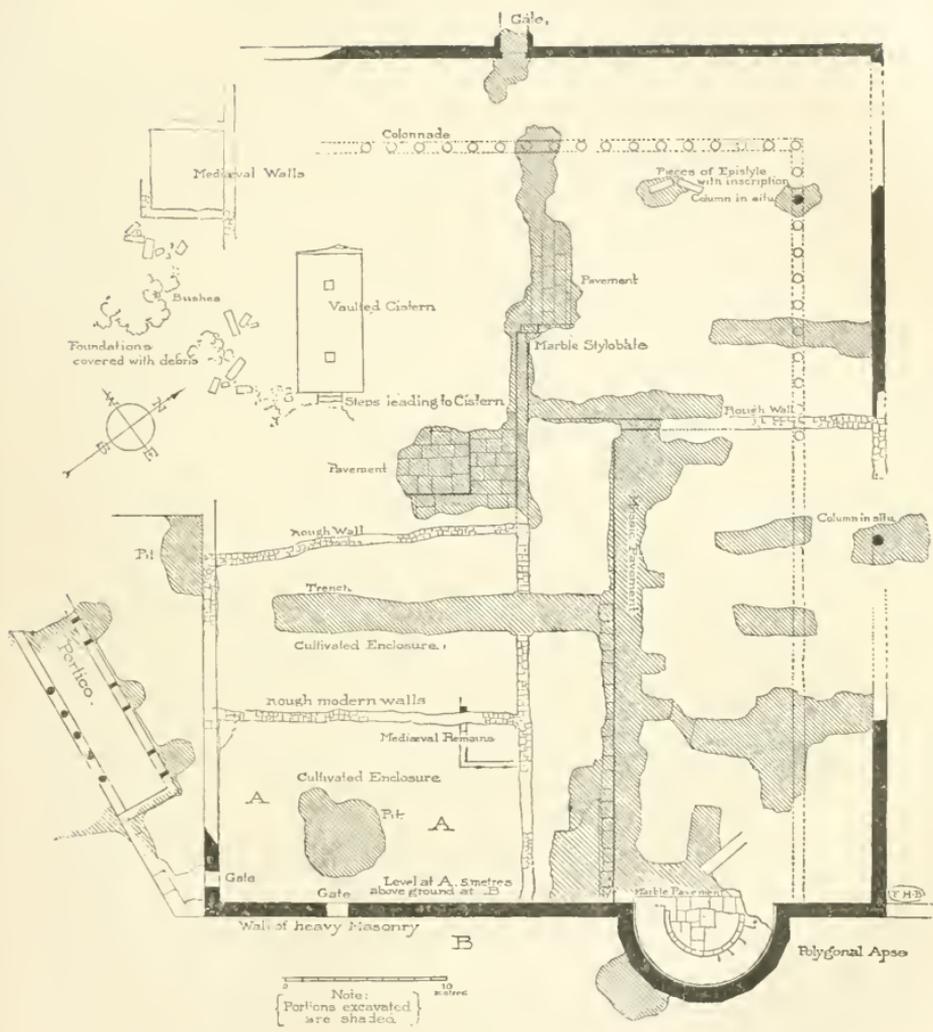


PLATE 4. GYMNASIUM (?).

broken cornice blocks and mouldings being so incomplete as to afford no guide to the original purpose or appearance of the structure. This state of destruction had been brought about by the systematic burning of the stone, the blackened walls of a mediæval lime-kiln standing directly beside the stylobate.

The floor of the late building, of which the apse formed the termination, proved to be a marble mosaic. This was followed by a trench to a length of more than thirty metres. The border of the pattern was nearly intact, but the centre appeared in great part broken away. Within the limits of this building, which seems to have been a sacred and possibly originally a forensic basilica, were found various fragments of Byzantine decoration sculptured in relief, bearing the cross, palm branches, etc.

To these four sites within the city walls, to which more or less attention was paid during the year,—namely, the Acropolis, stoa, theatre, and gymnasium,—is to be added the street of tombs outside the fortifications. By similar preliminary excavations the general disposition of the terraces was here determined, and a number of sarcophagi, exedras, and vaulted tombs were examined. The stone pavements were covered with fine earth, washed down from the heights of the Acropolis, varying in depth from half a metre to three metres. In many places the slabs were still in position. All the sarcophagi had been opened and despoiled in former times. The heavy lids of some had been lifted off, and lay upon the ground next to the enormous coffers; others had been broken into from the side.

An amusing instance of the ignorant rapacity of the riflers is presented by a small solid sarcophagus, which once served as the decoration of some mausoleum. The attempts made to pry off the lid are evident from the rough chiselling of

the fictitious joints, and the disappointment of the treasure-seeker is shown by the spiteful battering of the sides, which were not to be broken into like those of the hollow chests. Choiseul-Gouffier relates that some years before his visit the heavy rains, washing away the accumulated earth, had exposed a sarcophagus which had never been plundered. All the inhabitants of the village assembled, and the coffer was broken open in the presence of an official; it was found, however, to contain no treasure, and the human remains, with the household utensils buried with them, were flung away.

Many sarcophagi entirely buried beneath the soil were found during the excavations of the past year, but none which had not been opened. Trenches were dug around a number to expose the carved ornamentation of their sides, and two exedras were wholly freed from earth. Two vaulted tombs of interesting construction were also excavated, both having been stripped of their façades and choked with débris. Two imperfect inscriptions upon large marble slabs were found during this work, but it was not possible to decipher them before the recovery of further fragments.

Toward the close of the season trial pits were dug in the river-bed to trace the foundations of the ancient Greek bridge; but this interesting investigation soon had to be relinquished because of the rapid rise of the stream. During half the year the Touzla is almost stagnant; but the broad sandy reach which intervenes between the narrow summer bed and the high water mark, and upon which the piers in question stand, is overflowed by the heavy rains of October.

Of the eleven weeks during which excavations were carried on, six were spent upon the Acropolis in uncovering the temple plan and in investigating the late fortification walls in

search of reliefs. The staff of men was comparatively small during these first weeks,—the news that employment was to be obtained on the site travelling slowly. The pits and trenches dug at the stoa, and the clearing of the earth in the subterranean passage and Byzantine rooms beneath, occupied two weeks. Scarcely six days each could be devoted to the remaining sites, — the theatre, gymnasium, and street of tombs. All the digging carried out in the lower town can count for little more than a preliminary investigation.

It was perhaps a disadvantage that the work of the year had so to be planned that its results should present, so far as possible, an independent study of the city. The undertaking of a second campaign was by no means certain.

Towards the end of October, some time before the date fixed upon for the suspension of the work, digging was brought to a sudden close by official interference. By one of the laws relating to the antiquities of the Ottoman Empire, it is required that excavations undertaken at a distance from towns so great as to render supervision by local authorities difficult shall be watched over by a governmental commissioner, whose salary is to be paid by the investigators. Notwithstanding the restrictive clause, this law is enforced in whatever neighborhood the work is carried on, even in populous cities like Bergama¹ and Tersoos.²

Upon the granting of the *iradeh*, the Minister of Public Instruction, Kiameèl Pasha, stated, in reply to a direct question, that before the commencement of digging, and during any considerable suspension of the work, the presence of the commissioner upon the site would not be required.

A week before the arrival of the first laborers due notification was sent to the local authorities of Iradjik, and a commissioner was obtained, to whom was paid the maximum

¹ The ancient Pergamon.

² The ancient Tarsos.

salary customarily allowed in similar undertakings (at Troy, Pergamon, etc.). The presence of this guard at the scene of the excavations proved to be a mere formality, and the amicable relations of the Expedition with the gentleman appointed to the post, Mehmet Effendi, member of the council of Iradjik, were perfect.

It became evident that, on account of the advancing season and gradual desertion of the men, excavations would have to be suspended for the winter at the end of three months, — on the 6th of November. On the 1st of October notice to that effect was submitted to the local authorities, and formally accepted. It is with pleasure that the obligations of the Expedition to Shefkèt Bey, Kymacàhm of Iradjik, are here acknowledged; the familiarity of that gentleman with the French language, and his liberal views, the result of residence as attaché of Turkish embassies in various European capitals, made intercourse with him personally agreeable, and assured his favorable consideration for our work.

About two weeks before we proposed to close the excavations a Turkish office-seeker, of a type familiar in the ante-chambers of the Sublime Porte, arrived at Assos, stating that he had been appointed commissioner to the Americans at Behrà, by authorities above the Kymacàhm in power. He at once demanded excessive travelling allowances, and maintained that his salary, — in amount thrice the generous sum before paid, — was to be continued throughout the winter, whether work were carried on or not. The new-comer presented no credentials whatever, but, on referring the question of his official character to Shefkèt Bey, assurance of his direct dependency upon the Pasha of the Dardanelles was given.

To accede to such excessive demands was out of the question; to accept the new official would be to give a precedent

for all manner of extortion in the future. Still it was requisite to procure in person an endorsement of the Minister of Public Instruction upon the *iradeh*, which could be displayed to the Kymacàhm, and, if need be, to the Pasha of the Dardanelles. This direct appeal to the eventual arbiter of all questions relative to the prosecution of excavations in territory under Turkish rule was wholly successful, after the usual delays attending the transaction of business at Stamboul. The would-be commissioner retired from the scene without even collecting his expenses. He had gained nothing, and the probability of similar attempts at extortion had been greatly diminished for the future; but meanwhile the work had been stopped, and the enforced close of the excavations was vexatious.

It was fortunate that the heavy sculptured blocks from the Acropolis had been brought down to the magazine at the port early in the season, for at the end of the year laborers enough did not remain to perform this task expeditiously.

It is well known that all pictorial representations are an abomination unto the Moslem; on this account it proved necessary to remove the reliefs from the reach of the Turks as speedily as possible. The villagers of Behràm gradually became too closely attached to the interests of the Expedition, by the friendly and unobtrusive bearing of its members, and by the material profit derived from the work, to make any hostile demonstration; but the wilder peasants and herdsmen who came to the site from time to time were not always well disposed. The mosque of Behràm is the only place of worship for miles around, and the inhabitants of the neighborhood frequently assemble, in festive attire and high spirits, to listen to the droning intonation of the Imam. After the excavations had been transferred from the Acropolis to the lower town the visitors always crowded, on Friday afternoons, to the exposed

foundations of the temple, and twice raised the heavy carved blocks which had been left, face downwards, on beds of fine earth, setting them up as targets for stones. Although this stoning was rather the result of wantonness than of malice, and prompt intervention allowed no time for noticeable damage, the occurrence caused a constant fear that so long as the sculptures remained upon the ground they might be defaced. The slightest injury would have been irreparable, and until the means of transport were obtained a watch was stationed to guard the discoveries.

Among the articles soon after brought from Pergamon was a sledge, which had been built by Dr. Humann for the purpose of removing heavy stones from the mighty citadel of that royal town to the roads practicable for wagons. Upon this the reliefs found by the present Expedition were securely bound and dragged down the steep slopes of the Assos Acropolis to the sea, by the whole gang of workmen.

It has been mentioned that the track formed by the Turkish soldiers in their work of destruction was utilized in the preparation of the road for the sledge; yet there still remained, especially in the upper course, many gullies to be filled up, and enormous blocks of the thickly strewn ruins to be thrown aside. The road descended in a tolerably direct course from the summit of the Acropolis to the port; but so great was the exertion required, that the transport of the smallest sculptured blocks could not be effected in less than two hours and a half. Like the laborers represented upon Egyptian and Assyrian reliefs as moving gigantic statues, the men at Assos pulled upon either side of two long and heavy ropes, while the weight was started from behind by levers; and, as was customary five thousand years ago, shouting and the clapping of hands formed an obligatory accompaniment. Facilitated as it was by the steepness of the track, the noisy exciting

work afforded an almost childish amusement, and was usually reserved for the end of the day.

After the close of the excavations Messrs. Bacon, Diller, and the writer remained upon the site until the 1st of December. The results of the work were added to the map, the buildings unearthened were measured, and the preparation of the present Report and of the geological appendix to it began.

The excavations proposed for the second season have been carefully considered, and it is with pleasure that the long and uninterrupted work, to begin in March, 1882, is looked forward to. The delays and difficulties experienced in the past year, and the requisite preliminary survey, restricted the digging to one third of the time which it is hoped actively to employ during the coming campaign. The exertions and experiences of the first season are full of value for the second; the broad foundation of the investigations at Assos has already been laid; it is comparatively easy to add elaborate details to the general plan of the city. The expense of outfit and installation must always be one of the chief items in the cost of explorations in so distant and inhospitable a land.

It is believed that four weeks' further digging will suffice thoroughly to complete the studies upon the summit of the Acropolis; the amount of time and attention required by the other sites will become evident as the work advances. Upon all sides there are important and interesting questions awaiting solution; and in the deep slides of earth, such as have been formed between the stoa and the base of the Acropolis, and directly above the theatre, remains of antiquity may be brought to light, of the existence of which there can as yet be no conception.

Chief among the problems reserved for solution during the present year, in extent as well as in interest, will be those connected with the fortification walls built at various periods of

the city's history; and notably the outer enclosure, which, though known only from one of Texier's inadequate plates, has long been famed as the finest existing monument of Greek military engineering.

The outlines of the sketch map of Æolic Mysia and Lesbos here given are derived from the accurate coast surveys of the English Admiralty. The charts consulted were those of the Dardanelles, No. 2,429, surveyed by Graves, 1840, Spratt, 1855, and Wharton, 1872; of the entrance to the Dardanelles, No. 1,608, surveyed by Spratt, 1840; and of Mytilene Island, No. 1,665, by Copeland, 1834. The last includes the northern coast of the Gulf of Adramyttion. The course of the Satniocis and the position of the ruins of the Southern Troad have been determined by an independent compass triangulation, made by the present Expedition, — in chief part by its indefatigable geologist. The ancient towns have been added from the descriptions of their sites given by scientific travellers of the past century, from the references of ancient authors, especially of Strabo and Pliny, and in some few instances from the authority of the most eminent archæologists who have written upon the topography of Asia Minor, — Forbiger¹ and Cramer.²

The map is here given only as indicating the general features of the land during antiquity. No attempt has been made to display the important relations of mountain and plain. A map on a larger scale, embodying all the observations of the Expedition, and complete, so far as possible, in respect to modern and mediæval as well as ancient geography, is re-

¹ *Handbuch der alten Geographie, aus den Quellen bearbeitet* von Albert Forbiger. 2 Bände. Leipzig, 1842, 1844.

² *A Geographical and Historical Description of Asia Minor, with a map*, by J. A. Cramer. In two volumes. Oxford, 1832.



served for publication with a projected essay upon the topography and topographical history of the Southern Troad.

The best existing map of Asia Minor is that of von Moltke, von Vincke, and Fischer, published in Berlin in 1844, and accompanied by a memoir relative to its construction.¹ The eminent geographer Dr. Henry Kiepert edited this map from the surveys of the gentlemen mentioned, who were Prussian officers temporarily in Turkish service. Its scale is 1 to 1,000,000, and it includes, besides the whole of Asia Minor, Armenia, Kurdistan, and Azerbaijan.

An outline map, scale 1 to 3,000,000, is given by Tchi-hatcheff, as an illustration of his great work upon Asia Minor before referred to.² It appears in two forms, as a colored geological chart, and as an indicator of the routes followed by the traveller during different years. A small portion of the northwestern corner of Asia Minor is also included in the official military charts of the Austrian Geographical Institute, that numbered *P* 14 of the Central European Series giving the greater part of the Troad, scale 1 to 300,000.³

For those desirous of closely following the geological inves-

¹ Title of map: *Karte von Kleinasien, entworfen und gezeichnet nach den neuesten und zuverlässigsten Quellen; vorzüglich nach den in den Jahren 1838-39, von Baron von Vincke, Fischer, und Baron von Moltke, Majors (sic!), im k. Preuss. Generalstabe, und 1841-43, von H. Kiepert, Prof. A. Schönborn, und Prof. K. Koch, ausgeführten Recognoscirungen.* In vi. Blättern. Redigirt von Heinrich Kiepert. Berlin, 1844.

Title of text: *Memoir über die Construction der Karte von Kleinasien und türkisch Armenien*, von v. Vincke, Fischer, v. Moltke und Kiepert; *nebst Mittheilungen über die physikalisch-geographischen Verhältnisse der neu erforschten Landstriche.* Redigirt von Dr. H. Kiepert. Berlin, 1854.

Another map of the land, on a still more generous scale, 1 to 400,000, intended to embody the results of all the recent surveys of the interior, is in preparation by Dr. Kiepert, who proposes also to publish his itineraries in the Troad during 1841 and 1842, on a scale of 1 to 100,000, which cannot fail to prove a most important addition to our knowledge of that country.

² See *ante*, p. 8, note 3.

³ Published in 1878 by R. Lechner. Vienna.

tigations made during the past year, this Austrian map will be found the most serviceable of those hitherto published, being on the largest scale, and giving with reasonable accuracy the position of nearly all the Turkish villages mentioned by Mr. Diller.

The most recent map of the Troad is that prepared by Professor Ernst Ziller, of Athens, and Carl Heise, cartographer of the Royal Prussian survey, for Dr. Schliemann's Travels in the Troad during 1881.¹ It is almost beneath criticism, — being without scale, or degrees of latitude and longitude, and so incorrect that, for instance, the outline of Lesbos is drawn without its two great gulfs!

While the land of Europe is invaded on all sides by water, the general character of the enormous Asiatic continent is that of compactness, and its coast-line is comparatively short. Still the favor of fortune which formed the long peninsulas upon the northern shores of the Mediterranean, and so signally advanced and assured the commerce and civilization of Greece and Italy, was not wholly withdrawn from that part of Asia Minor bordering on the Ægean. It has been remarked that the waves of that sea seem to have a peculiar power of penetrating and dissolving parts of the land upon which they beat, forming islands, peninsulas, and capes by this dissolution, and creating a disproportionately long coast-line, with many gulfs and nooks favorable to primitive marine intercourse.

All Asia Minor turns its back upon the steppes and deserts of the interior continent, no considerable river running to the east, and the Troad is separated from inner Mysia by rugged and uninhabitable highlands. If Asia Minor appears reluctant to belong to the great continent, the Troad unequivocally opens its arms to Greece. The Ægean, from the earliest

¹ See *ante*, p. 14, note 2.

ages of marine intercourse, while seeming to divide has really united the opposite shores, and the water-way to Europe has been more practicable than the overland journey to the inner countries.

The Troad is the portion of Asia most nearly allied to Europe. Its eventful history tells of successive colonization by Phœnicians, Carians, Leleges, and finally by Æolic Greeks. It was conquered successively by Crœsus and Cyrus; it was among the earliest of Roman possessions in Asia; it often changed hands in the struggles between the Byzantine Greeks and Latins, and at length it submitted to and sank under the blows of Seljukian and Ottoman invaders.

Leaving out of account the unsubstantial realm of ancient Iliion, Assos appears to have been in ancient times the most populous and flourishing city of the Troad. It was, moreover, the chief citadel of the land.

Towards the close of the tertiary period an extended volcanic upheaval revolutionized the northern coasts of the Gulf of Adramyttion. Two flows of trachyte — forming craters, dykes, and plateaus — covered the original limestone so completely that it is only in small and isolated patches that stratified deposits remain upon the surface to display the former geological condition of the land. A crest, rising to a height of five hundred metres, was thrown up along the coast from Antandros to the promontory of Lecton. The Satnioeis, second only to the Scamander among the rivers of the Troad, rises only six or eight kilometres from the Gulf, but, hemmed in by this continuous range, does not reach the Ægean until after a course estimated at not less than seventy kilometres.

At the point where the Satnioeis most nearly approaches the coast of the gulf, the intervening strip of land is but one and one-half kilometres broad. It was here that the crater of a volcano formed the Acropolis of Assos. Situated between

stream and sea, rising steeply to a height of more than two hundred and thirty metres, and wholly isolated from other peaks, the cone is one of the most prominent features of the country.

The inclination of the land between the port and the summit is represented by Plate 5.¹ The average height of the surrounding plateau is about that of the terrace occupied by the theatre ; all above this may be considered as the elevation of the Acropolis.

The crater was choked by the second and final flow of trachyte, — the stone which has had signal influence upon the topography and architecture of Assos. This material cleaves naturally to vertical and horizontal joint planes, and it is often difficult to distinguish the surfaces thus formed from those hewn by the hand of man during the systematic quarrying from the cliff.² The sides of the Acropolis assumed the character of a vertical rampart, which reaches the greatest height in a double tier on the south and west. The view of the Acropolis from the northwest, Plate 6,³ shows its cliffs, which

¹ It is to be remarked that those not accustomed to judge the proportions of topographical sections will be naturally inclined to undervalue the steepness indicated in Plate 5. The elevation is not exaggerated, contrary to the usual custom of introducing two scales, and making that of the vertical dimensions from twice to ten times as great as that of the plan.

² Compare the remarks on the second trachyte of Assos in the geological appendix.

³ This view (Plate 6) is taken from a spot near the road which leads to the northwest from the point shown on the edge of the topographical plan of the city, Plate 1, as the site of "ruins." The grain-fields of the foreground have in great part been reclaimed by the villagers since the writer's first visit to the site. Beyond them are the overthrown sarcophagi of the street of tombs, before the principal gate of the fortification walls. The ramparts can be traced from the re-entering angle to the declivity on the southwest of the Acropolis, and their outline is evident as far as the low towers which mark their extent upon the north. The transverse division wall is seen greatly foreshortened. At the left of the summit are the semicircular Turkish bastion, a mediæval tower on Hellenic foundations, and the early Christian church now serving as a mosque. Beneath these follow the houses of Behrâm.

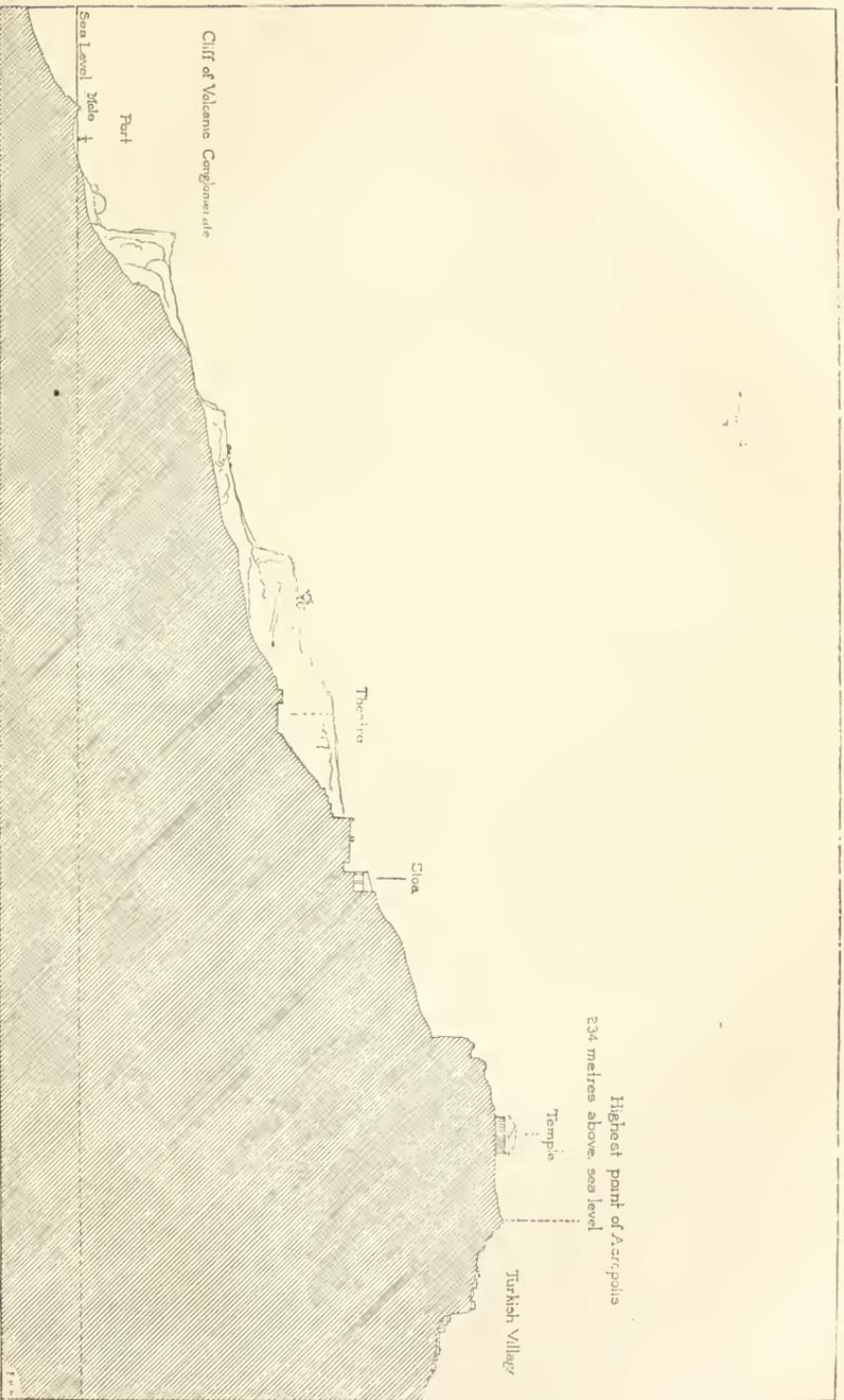
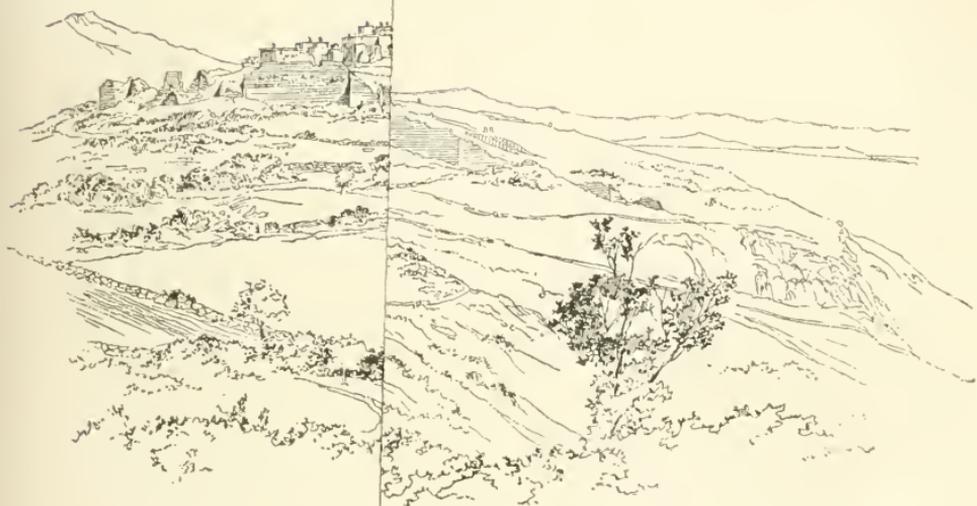


PLATE 5. SECTION OF THE ACROPOLIS OF ASSOSS.



H. WALKER. DEL.



PLATE 6. ACROPOLIS OF ASSO8.

are also indicated in their full height, upon the south, by the section Plate 5.

Naturally steep upon all sides, and rendered still more secure by a judicious scarping of the rock, the summit became wholly impregnable by the construction of enclosing walls. The limited circuit was easily to be defended, while the enclosed area was still of sufficient extent to accommodate an adequate garrison. A fissure in the rock of the lower step forms a natural well, and the supply of water was still further assured by the excavation of deep cisterns at this point. It was with truth that Strabo¹ remarked that Nature and Art had united to make Assos a stronghold.

The view from the Acropolis is magnificent. At the north, beyond the Turkish village, the land descends rapidly to the alluvial plain formed by the Satnioeis. The river emerges from a rugged and confined gorge, and, winding through the green fields, is lost to sight in the dense oak forests of its lower course. The great volcanic plateau, which separates the stream from the sea, extends to the west, rising above Lecton to a height even greater than that of the isolated crater of Assos. At the south, occupying nearly half of the horizon, lies the Gulf of Adramyttion, stretching from the little port, in the extreme inner nook, which bears its name, to the open *Ægean*, north of Cape Sigrion. Beyond this narrow channel is "the noble and pleasant island" of Lesbos, the pearl of *Æolic* lands. At the foot of Lepethymnus the promontory and citadel of Methymna is relieved against the majestic mountain which glows with constantly changing light and color, as the seasons of the year and the hours of the day advance. In the far distance, directly south of Assos, rises the peak of the Mytilenian Olympus. At the east tower

¹ Strabo, xiii. 610.

the heights of Ida, the domes of Gargarus and Cotylos, and on a lower level Mt. Alexandria, famed for the judgment of Paris. Upon every side scenes of Greek legend and history are presented to that powerful second-sight of the lover of antiquity which sees the busy life of former ages where now remain but trackless plains and desolate ruins. In all Greek lands, from Sicily to Cilicia, no Acropolis is more favored than that of Assos, few more beautiful.

The primitive races of the Mediterranean coasts everywhere built their towns upon such eminences or at the foot of them; and this citadel thus directly upon the sea, and yet secure from piratical attacks, must have been occupied by the first inhabitants of the Troad. Thucydides,¹ indeed, remarks that in the most ancient times cities were founded at a considerable distance from the sea, in order that they might not be surprised by the sudden descents of pirates; but that after the advancing civilization had brought immunity in this respect, a situation directly upon the shore was preferred. The inland positions of Troy, Athens, and many other cities near the Ægean must have been determined by such considerations of safety. At Assos, however, the high plateau and inaccessible Acropolis, though close upon the shore, were easily defensible, so that from the first its inhabitants were secure while they enjoyed the benefits of proximity to the sea, as well as the advantages afforded by the neighboring river and the fertile alluvial plains formed by its waters.

The volcanic range, before mentioned, descends steeply upon the entire northern coast of the Adramyttion Gulf, nowhere affording a natural shelter either of roadstead or of port. The building of a mole, midway between the inner end of the Gulf and the promontory of Lecton, provided a refuge most welcome to the voyagers on the way from the

¹ Thucydides, i. 7.

city of Adramyttion, or from the natural harbor of Heracleia,¹ to the great marine highway of the Hellespont, while it secured to Assos the monopoly of the commerce arising from the export of the produce of the Southern Troad and the import of foreign merchandise required by that land.

The history of the mole would be the history of the material prosperity of the city. When a storm washed away the upper part of the breakwater two years ago, it was the first care of the native merchants to patch it up with heaps of small stones, — temporizing with the fate which threatens the entire destruction of the port by silting up the shallow basin. Thus while the existence of Assos was primarily determined by the strategic advantages of its citadel, the further growth of the city was due to the commerce attracted by it as the only continental port upon the Gulf of Adramyttion. It was its mole that made Assos the chief mart of the Troad, notwithstanding the fact that the area of the arable land of the Satnioeis valley is much less than that of the Scamander, with its broad-stretching plains. Assos was the sole emporium of the southern country, with the exception perhaps of a limited district in the immediate vicinity of Lecton. The later artificial port of Adramyttion at the end of the gulf was separated from the valley of the Satnioeis by the heights of Ida, and, deriving its exports mainly from the fertile Theban plain, can never have materially interfered with the commerce of Assos.

Miserable as is the present village of Behràm, it still in great measure maintains the commercial relation to the interior that during antiquity rendered Assos the chief mart of the land south of the Scamander. The port is always crowded

¹ The magnificent harbor here formed by the group of islands known to the ancients as Hecatonnēsi has in recent years secured the growth of the flourishing town of Ivalee, referred to on p. 3.

with coasting vessels,— seldom less than eight, often more than twenty, lying within the mole. Communication by their means is regular between Behràm and Smyrna, Mytilene, Ivalée, and Molivo.¹ In fair weather live-stock is daily carried across to the opposite island. The merchandise most extensively exported is valonia, the district in which Behràm is situated producing greater quantities of this valuable tanning material than any other province of the Ottoman empire.² Long trains of camels bring the valonia from all parts of the interior to the port, where it is stored in the magazines and slowly loaded upon the boats. In the busy season seventy or more camels may sometimes be counted on the narrow strip of land between the cliff and the sea.³

The port at Babà might seem a dangerous rival to Behràm, being fairly protected by the gigantic blocks of the mole mentioned by Strabo, lying nearer to Europe, and not situated under the lee of far-stretching cliffs; but it has only a trifling commerce. Babà-calessi, though strongly fortified, and a considerable centre for certain Turkish manufactures,⁴ is too dis-

¹ The ancient Methymna.

² According to statistics given to the writer by Levantine merchants, the annual production of the district of Mytilene, Iradjik, Eanedeh, amounts to 140,000 cantars,— the cantar being theoretically equal to 56.1 kilograms (123.7 pounds avoirdupois). The most extensive forests of the valonia-oak in the Troad are in the Touzla Valley, and dependent upon the port of Behràm.

³ Behràm has lost much of its strategic significance by the extermination of the pirates, who so lately troubled the shores of the Adramyttion Gulf, and by the present security of the land from marauders,— both resulting from the general advance of civilization in the Levant. The village itself is, probably, not much larger than it was during the last century; but the port has become of much greater importance. Three of the four magazines at the water's edge were built during the last twenty years; the largest of them, which served the Expedition as a dwelling, being not yet two years old. In 1816, at the time of Von Richter's visit, three vessels lay within the mole; to-day the number would average sixteen or eighteen. This increase of commercial activity indicates a gradual amelioration of the interior country, evident from other considerations.

⁴ The cutlery of Babà-calessi has a far-spread reputation, especially its silver-handled knives of peculiar fashion.

tant from the three fertile plains of the Touzla to possess much export trade.

The commerce of Behràm, which with this exception remains the only sheltered port on the coast of the Troad south of the Hellespont, is relatively petty enough. Pasturers of herds were never willing servants of Demeter; and now that the Turks — a people by nature nomadic, and possessed with a supreme contempt for agriculture — have dwelt in the land for over four centuries, the fields bring forth but a small fraction of what they might be made to produce by thorough cultivation. The invincible repugnance of the Turks to tilling the soil is a characteristic of the greatest political and economical importance, perhaps even the point of greatest moment in their inevitable national decline.

The gradual destruction of the forests of the Troad has been followed by parched summers and stormy winters. The streams disappear in the dry season, to flood and devastate their banks during the rainy months. The accumulated soil has washed away from the volcanic highlands, exposing barren crests of rocks, and covering the humus not within the reach of freshets with beds of sand and gravel. Only a small fraction of the once arable land is tilled at all, and the country which formerly exported grain is now barely able to supply its own demands, — though supporting perhaps the fourth, perhaps but the tenth part of its ancient population. A horn-of-plenty upon the coins of Assos once indicated the fertility of its territory;¹ the symbol would most certainly now be inappropriate. The area occupied by the city proper, within the line of fortifications, appears never to have exceeded one-half a square kilometre, fifty hectares,² — a small surface,

¹ Several examples of the cornucopia upon coins of Assos are given by Mionnet, *Description de Médailles antiques, grecques et romaines*. Vol. ii. Paris, 1807.

² About one hundred and twenty-four English acres.

indeed, compared with the extent of modern towns. Still the number of inhabitants assumed for Athens, Ephesus, or Syracuse, at the time of their greatest power, stands in small relation to the crowded population of existing capitals.

The limits to the growth of Assos, fixed by the natural formation of the land, were not less marked than the advantages of its site. The position of the city upon a promontory divided from Inner Mysia deprived it of any extensive political influence, like that long enjoyed by Pergamon. The port, upon a gulf which retreats from the regular marine highways of the Orient, never could assume the character of a commercial centre for the goods of other countries. Its position was not such as created a populous city upon the barren Tenedos at the mouth of the Hellespont, or concentrated the nautical activity of the Archipelago at Delos in antiquity, — at Syra in the present century.

Secure within the unrivalled ramparts provided by Nature and Art; nestled around the archaic Doric temple of the Acropolis, so high above the sea as to lose the noisy cries of the busy little port, — ancient Assos may be imagined as a staid and orderly commercial town, tenacious of long-established usages, and conservative in its interior and exterior politics. It is to such a well-ordered existence that all the indications afforded by inscriptions and public monuments point.

The history of Assos has been varied and eventful, but from the natural conditions of the land, already referred to, rather passive than active, and hence not recounted in detail by ancient writers. It is probable that the Phœnicians, the first known seafarers in the waters of the *Ægean*, colonized a land of such importance as the Troad to their extensive trade with the Pontus. No names or positions of Phœnician trading-posts have been handed down; but the prominent

citadel of Assos, rising directly above the sea, must have been among the first sites to attract the colonization of these marine adventurers. The remains of a fortification enclosure of most primitive polygonal masonry exist upon a height a few hundred metres to the west of the port, termed by the Expedition the "Seaward Acropolis," and have not been disturbed by an occupation of that site during the historical ages, and evidently antedate the Greek colonization of the land.

From the Hecatonnēsi to the Hellespont no shelter whatever is provided by natural indentations. Of the three moles, which have been built on the southern and eastern coasts of the Troad to supply this pressing need,—namely, those of Assos, Lecton, and Alexandria Troas,—the truly gigantic blocks at Lecton may possibly be the most ancient, as that cape is an important turning-point of the winds, and often a port of unwelcome detention; but the first building of a break-water at Assos cannot be referred to a much later date.¹

The rough and piratical Carians in great measure kept step with the Phœnicians in the pursuit of the profitable commerce of the Euxine, and they too colonized the Troad; in all probability occupying the same stations, as they are known to have done on the shores of the inland sea.

The prehistoric population of the Troad seems to have been driven from the land in the earliest historical ages by that branch of the Thracians known to Strabo, and to all later antiquity, as Mysians. The people to whom this geographical denomination was applied were of the same stock as the Leleges, who at the period described by the Homeric poems

¹ The location of an "ancient mole," at Point Sivrijee (a slight projection of the land near the site of Polymedion), is one of the extremely rare mistakes of the chart of the British Admiralty, No. 1,665, referred to above, p. 9. The peculiar formation of a natural reef at this point gave rise to the error. An extensive consideration of the ruins of Polymedion, discovered by the present Expedition, will form an interesting chapter in a future Report.

occupied the northern coast of the Adramyttion Gulf. The identification of Leleges and Carians, referred to by Strabo,¹ appears inadmissible; but traces of a preceding Carian occupation of the Troad, such as the names of towns, may naturally have been retained by the former people.

It is an opinion not hitherto advanced, which seems to the writer capable of support, that Pedasos, the capital city of the Leleges, the town sacked by Achilles,² is identical with the later Assos. The Leleges, famed as navigators and pirates, inhabited the Southern Troad at the time of the Trojan war, being spoken of by Homer as living upon the coast.³ This statement is confirmed by Strabo, who describes the province of the Leleges as extending from Lecton to Ida,⁴ and again especially states that they possessed the country around Assos.⁵ In the first passage of the Iliad bearing upon the city in question, Elatos is spoken of as living "by the banks of the Satnioeis, in steep Pedasos."⁶ In the second, the king of the Leleges, Altes, maternal grandfather of Hector, is said to have dwelt in "lofty Pedasos upon the Satnioeis."⁷

In seeking the chief town of a seafaring nation, thus designated as rising above the Satnioeis, it is reasonable to look at once to the one remarkable spot where that stream, though at a distance of thirty kilometres above its mouth, so nearly approaches the coast that the settlement upon the intervening strip of land is situated both upon the sea and the river. An

¹ Strabo, xiii. 611. The ancient geographer mentions the opinion, but does not assert it as his own. Its improbability has been displayed by Dr. W. G. Soldan, *Ueber die Karer und Leleger*, in the *Rheinisches Museum für Philologie*, Jahrgang iii., 1835; and by Dr. Heinrich Kiepert, *Ueber den Volksnamen der Leleger*, in the *Monatsberichte der königl. Preuss. Akademie der Wissenschaften zu Berlin*, 1861; Berlin, 1862, — to which excellent essays the writer would refer for details concerning the Leleges.

² Iliad, xx. 92.

⁴ Strabo, xiii. 605.

⁶ Iliad, vi. 34.

³ Iliad, x. 428.

⁵ Strabo, xiii. 611.

⁷ Iliad, xxi. 87.

almost direct proof that the citadel at this point, which by nature commands the Southern Troad, served as the Lelegian as well as the Greek capital is further offered by the fact, that, in following the Satnioeis from the Halesian Plain of its delta to the headwaters of the rugged interior, no other site occurs to which the epithets *αἰπεινός* and *αἰπήεις* could be applied. The Acropolis of Assos is thereby described with that truth to nature characteristic of the poet, whose thorough acquaintance with the Troad is evident in all his local descriptions.

The relation of the names Pedasos and Assos seems confirmatory of this conjecture; and the often remarked lack of all direct mention of Assos in the Homeric poems is explained by it, — an omission the more surprising as the citadel is so conspicuous a feature of the land. In reading the Iliad in the Troad, one is readily inclined to believe the scholiast's tale that the poet resided at the Trojan Kenchreae while composing his work, and to doubt his blindness at the time.

Strabo¹ mentions a town in the inner country of Halicarnassus named Pedasa, surrounded by a tract known even in his day as Pedasis; and it appears not impossible that the occurrence of the name in the native land of the Carians may point to the designation of our city as a relic of early Carian occupation of the Troad. The termination *ασσος*, *ασσα*, or *ισσος*, *ισσα*, signifying town,² retained in the names of several cities of Mysia and Lesbos (besides Pedasos or Assos, Lyrnessos, Caressos, Prepenissos, Corybissa, Thebassa, Eressos, Antissa, Larissa, etc.), is extremely com-

¹ Strabo, xiii. 611.

² Dr. Fligier, *Beiträge zur Ethnographie Klein-Asiens und der Balkanhalbinsel*, Breslau, 1875, derives this termination from the Sanscrit, and points to its occurrence in almost all the lands famed in ancient history, from Dacia to India.

mon in Caria and the neighboring tracts (besides Pedasos, Iassos, Halicarnassos, Mylassa, Halmylessos, Milessos, Adessos, and Tymnissos, that is, the city of Tymnos, a Carian hero, in Caria; Pelmessos, Sagalessos, Carmylessos, Acalissos, and Habessos, a name of Antiphellos, in Lycia; Colobrassos, Sagalessus, Tarbassos, Aarassos, Termessos, Pednelissos, and Selgessos, the ancient name of Apamea, in Pisidia; Ariassos and Termessos in Cabalia; Coropassos, Adopissos, and Pirnissos in Lycaonia, and many others). In many of these cases the independent significance of the prefix is recognizable, so that it is conceivable that it might be dropped off as in the case of Assos.

In the passage last referred to, Strabo speaks of Pedasos as not in existence in his time; but his failure to identify it with Assos may be compared to his fallacious argument concerning the site of ancient Troy, and his refusal to admit the identity of the primitive Chrysa with the town bearing that name at a later day.¹

Strabo² quotes the passage from the Iliad in which Pedasos

¹ Dr. Schliemann, in his recently published book of Travels already referred to, p. 14, note 2, as well as in a paper previously read before the Anthropological Society of Berlin, which appeared in the *Augsburger Allgemeine Zeitung*, identifies Assos with the Homeric Chrysa; remarking: "ich glaube dies um so mehr, als, nach der Ilias (i. 431), das alte Chrysa einen Hafen hatte, der ihm auch von Strabo (xiii. 612), zugeschrieben wird, während an der ganzen nördlichen Küste des Golfs von Adramytteion Assos der einzige Ort ist, der einen solchen hat" (p. 23). That Chrysa was situated upon the Gulf of Adramyttion seems an assumption at variance with the shortness of the voyage of Odysseus, which appears to have been made, from Troy to Chrysa and back, in one of the poet's days. In this view the account would well agree with the identification of ancient and modern Chrysa, assumed on the accompanying sketch map. At a point of the coast near that site (the modern village of Kinlacleè) a small cove, constantly sought by fishing boats, provides good anchorage for vessels of no great draught, and, in most winds, fair shelter. Homer's description of the landing-place and the anchoring is better applicable to this spot than to one provided with a breakwater. Strabo, in the passage referred to, in regard to the harbor merely repeats the words of Homer.

² Strabo, xiii. 584.

is said to have been sacked by Achilles,¹ in connection with the piratical expedition of the hero to Lesbos, during which Thebe and Lyrnessos, also upon the Gulf of Adramyttion, and Chrysa, near Lecton, were ravaged. He speaks of Pedasos as in the country "opposite to Lesbos," and, if weight be attached to this testimony, the city can hardly be elsewhere placed than at Assos.

The importance of the Southern Troad in the progress of the arts during pre-historical ages is indicated by the Greek legend of the Dactyls upon the heights of Ida, rich in the metals employed by those primitive artisans, whose names—Kelmis, Damnameneus, and Acmon; that is, hammer, tongs, and anvil—designate cunning workers in iron and bronze. This personification points to the empaistic art of the Phœnicians, — an art which appears to have been practised in several mining lands exposed to the influence of that people, as Crete and Rhodes (Telchinæ). The significance of the conventionalized relief-sculpture upon the archaic temple of Assos, as affected in its style by the Asiatic overlaying of wood-carvings with sheets of beaten metal, will be referred to elsewhere.

One of the most important and interesting chapters of the early history of the Troad and of Assos to be filled out by future researches is that relating to the influence of the great Mesopotamian civilization upon the coast lands of the Ægean. — an influence of subtle and far-reaching character, affecting alike the politics and the art of the early Asiatic Greeks.

The recorded history of the Assyrians in the Troad consists of a few scattered passages in Greek writers, — the cuneiform inscriptions, hitherto deciphered and published, affording no direct information concerning a land which appears to have been beyond the borders of the Mesopotamian Empire even at

¹ Iliad, xx. 90-92.

the time of its greatest extent. It is not probable that Western Mysia was ever subjugated by the Assyrian monarchs, notwithstanding the assurance of Diodorus¹ that the Troad and the shores of the Hellespont were conquered by Ninus. Strabo² mentions walls in Tyana³ and in Zela,⁴ said to have been built by Semiramis, which make it evident that the conception of an Assyrian occupation of Asia Minor was entertained in the later ages of Greek antiquity.

While, however, we may doubt the fact of the actual incorporation of the Troad in the Mesopotamian Empire, it yet appears undeniable that that powerful state exerted a considerable political influence upon all the countries of Western Asia, possibly even demanding a regular tribute from those upon the northern coasts of the Ægean. This view is borne out by a passage in Plato's *Laws*,⁵ where the Trojans are spoken of as counting upon the support of the Assyrian Empire, "of which Troy was a portion." And Diodorus gives a tradition that the Assyrians, who at the time of the appearance of the Greeks under Agamemnon before Troy are said to have maintained their supremacy throughout Asia for a thousand years, sent a considerable contingent to the assistance of King Priam.⁶ These passages, if taken literally, are indeed of little historical value; but, like most such legends, they have a basis of truth.

From the cuneiform inscriptions we learn that the realm of Tiglath-Pileser I. extended, before the end of the twelfth century B. C., to the shores of the Mediterranean; that the

¹ Diodorus, ii. 2.

² Strabo, xii. 537, 559.

³ The present Kiz, or Killis Hissar.

⁴ The present Zilleh has retained the ancient name of its site almost unaltered.

⁵ Plato, *Laws*, iii. 22.

⁶ Diodorus, ii. 22.

great commercial cities of the Phœnicians, those early colonists of the Troad whose influence was so constant and extended, paid tribute to Assur-nazir-pal as a conqueror in 870; that Shalmaneser II. visited the shores of the sea included in his realm in 859; and that his successor, Vulnirari III., visited these provinces in 803 B. C. The celebrated stele sent by King Sargon to Cyprus in 709, now in the British Museum, attests the subjection of that powerful island, which was in so many respects the cradle of Hellenic culture. The Assyrian account of the expedition of Sennacherib to the Persian Gulf in 697 is particularly interesting, when the vessels built by Syrian and Phœnician workmen were manned by sailors chosen from the seafaring nations inhabiting the coasts of the Ægean, and notably by Ionians. The Assyrian king could even contest the maritime supremacy of the Mediterranean with the fleet of the Greeks, winning a decisive victory on the coast of Cilicia, at a date not far from 690 B. C. The naval conquests of Tyre, at that time the greatest mercantile city of the world, and the conquest of northern Egypt, made by Assur-bani-pal,¹ must have spread the fame and influence of the Assyrians to the most remote lands of the sea. So extended was this pre-eminence by the middle of the seventh century that even the Lydians sent tokens of submission to the Mesopotamian despotism. Sardes, the Lydian capital, was less than two hundred kilometres distant from Assos.

The peculiar importance and interest of the Assyrian influence consists in its bearing upon the advancing civilization and art of the Asiatic, and through them of the European, Greeks, rather than in any direct political ascendancy. It is hoped that the recovery of the archaic temple, and more espe-

¹ Assur-bani-pal, 668 to 626, known to the Greeks as Sardanapalos.

cially of portions of its sculptured decoration, by the present excavations, may add somewhat to our knowledge of the development of the Doric style and of the early Greek stone-carving, which stood in undeniable relationship to the artistic spirit and methods of Mesopotamia.

The Southern Troad, once occupied by Leleges and Thracian Mysians, may be considered as sharing in some degree the aspirations and advance of the ethnographically allied Hellenic race. It was wholly and forever united to those interests by the Æolic colonization of Assos. In the latter half of the eleventh century the Æolian Greeks possessed the neighboring islands of Lesbos, Tenedos, and the Hecatonnesi. The commanding site of Assos, famed for its strategic and commercial advantages, appears to have been occupied by them about the same time.

It is not strange that the Greek settlers of Assos should have been reputed a colony of Methymna,¹ close as is the intercourse which the city is destined by nature to maintain with that opposite port. Methymna, the home of Arion, and at one period the chief city of Lesbos, retained in its name a reminiscence of the Ionian colonization of the island, which had preceded that of the Æolians. It is the site upon the northern coast of Lesbos, naturally corresponding to the Acropolis of Assos in the Troad; and, as offering similar advantages, must have been occupied from the earliest ages. The strait which separates the island from the continent is only ten kilometres broad, the distance between Methymna and Assos less than twenty. On calm days the passage is often made by row-boat; the winds prevalent during the greater part of the year, though heavy, are regular, and seldom raise a dangerous sea in so confined a channel.

¹ Myrsilos, quoted by Strabo, xiii. 610.

This easy communication by water tended to connect Assos more intimately with Æolic Lesbos than with the neighboring lands of the Scamander, to which the roads are rugged and difficult. In primitive and lawless ages the sea is always safer than the land; no ambush or unforeseen difficulty need be feared upon the narrow strait, which was overlooked from the citadel of either town. The low houses at the south of the castle of Molivo are visible from the port of Behràm and from the Acropolis; and on clear days it was possible to note the departure from the island of the little boat which weekly brought across the eagerly awaited mail of the Expedition.

The Æolians gradually Hellenized the tracts of the continent chosen for their settlements, apparently without any long warfare with the previous inhabitants, to whom they were in some degree ethnographically related. Some force was doubtless at first required, but the final results must have been mainly due to the superior activity and intelligence of the Greeks, who stood in much the same position to the Mysians of the tenth and ninth century B. C., as do their descendants to the Ottomans of the present day.

The Æolians appear to have acquired by degrees many traits of the original inhabitants of the continent, — even as the modern Greeks are in many ways affected by certain Turkish peculiarities of manner and speech.

Having become wholly Greek, Assos advanced in power and prosperity until it possessed an extended tract of the surrounding country, and was itself able to found the colony of Gargara upon a spur of the Ida range, twenty kilometres at the west. Though Assos may never have rivalled the greatness of the cities of the mother island, it was intimately connected with Methymna and Mytilene, at a time when they represented the highest contemporary advance of Hellenic civilization. When,

after an existence of nearly five centuries, Assos, in 560 B. C., fell into the hands of the Lydians, it is spoken of as the strongest and most important city of the Troad.

The Lydians took up the thread of Oriental domination where it had been dropped by the Assyrians. Their influence is of particular interest in the history of the civilization and art of Assos.

In the last half of the seventh century B. C., with the ascension of the dynasty of the Mermnadæ, the Lydians revolted from the yoke of Mesopotamia. The politic Gyges allied himself with Psammitichus in overthrowing the rule of Assur-bani-pal in Egypt; and though Ardys, son of Gyges, after the invasion of Lydia by the nomadic Cimmerians, tendered submission to the Assyrian monarch, the land did not again fall under the declining power of the Mesopotamian monarchy.

Concerning the independent development of the Lydian monarchy we have only the authority of Greek writers, who offer a history rather copious than consistent. Gyges seems to have dreaded the advancing civilization and political power of the Greek settlements of the coast, and is said to have conquered a great part of Mysia, including the shores of the Hellespont; so that the Milesians, the most influential Greeks of Asia, were obliged to request the permission of the Lydians to found Abydos, in the Troad.¹ One of the chief sources of the wealth of Gyges, Alyattes, and Cræsus was reported² to be a mine situated between Pergamon and Atarneus,³ almost within sight of Assos. The expansion of their power upon all the coasts of the Ægean is evident from many such accounts.

It is even possible that Assos had been subjected to the direct rule of the Lydians at an earlier date than that assumed.

¹ Strabo, xiii. 590.

² Strabo, xiv. 680.

³ Atarneus is identified with the present landing-place Deckclêe, from whence the tools brought from Bergama (Pergamon) to Behrâm were shipped.

Crœsus was appointed satrap of Adramyttion and the Theban Plain during the lifetime of his father, and his jurisdiction may well have included the neighboring cities upon the Gulf. Modern authorities believe this event to have taken place twelve years before Crœsus became king.¹ Adramyttion itself, named after Adramytus, another son of Alyattes,² was known to later ages as a settlement of the Lydians of this period.³

The Lydians, at least in the early ages of their history, were without an independent literature and art.⁴ Their conquest destroyed the political independence of the land, but does not seem to have interfered with the intellectual development of the Asiatic Greeks.

The artistic activity and progress of the Greeks on the Sporades, as well as in the chief cities of the main land, noticeable during the second quarter of the sixth century B. C., may in good measure be attributed to the fostering interest of the Lydian dynasty, and particularly of Crœsus. The building of the Artemision at Ephesus and of the great temple at Miletus owed much to the proverbial wealth and generosity of this monarch.

Unhappily the sovereignty of Crœsus was not of long duration. Fourteen years after his accession to the throne the Lydian Empire fell into the hands of Cyrus. The Troad, under the name of Phrygia upon the Hellespont, became a satrapy of the Persian Empire. So rude and unlettered a people as were the Persians of that age could have had little intellectual influence upon the countries thus transferred to their rule.

¹ See Baehr's note on Herodotus, i. 45.

² Aristot. in Stephan. Byz.

³ Strabo, xiii. 613.

⁴ The inventions of minted money and of inns for travellers were attributed to the Lydians. See Herodotus i. 94.

⁵ Arrian, i. 12; Xenophon, iii. 2, and iv. 1; Diodorus, xviii. 5.

The fall of Cræsus did but change the master by whom a certain proportion of the produce of the land was levied, the internal administration remaining almost unaltered. It is a noteworthy fact that the collectors of the tithes were more frequently Greeks than Persians. That the tribute was often oppressive there can be no doubt; but this was apparently rather owing to individual exactions of the agents than to unreasonable demands on the part of the Persian monarch. The entire tax required from the Hellespontians of the southern coast, Phrygians, Asiatic Thracians, Paphlagonians, Mariandynians, and Syrians (*i. e.* Cappadocians),¹ — namely, three hundred and sixty talents yearly, — does not appear excessive. Assos must have been too long accustomed to dependence upon foreign rulers to feel that exasperation at the supremacy of the Persians which, in Greece, led to the later victories of Salamis, Plataea, and Mycale.

After these signal defeats the Barbarians were driven from the Asiatic coasts of the Ægean. Herodotus concisely states,² that before the invasion of Xerxes there were Persian governors in Thrace and on the Hellespont; and that these, with the sole exception of Mascames, in Doriscus, were afterwards driven out by the Greeks. The resistance of the fortified Sestos was an exception deemed worthy of especial remark.³

It is probable that the towns of the Troad were freed by the fall of Byzantium (477 B. C.), if, indeed, the Persians remained in the land after their decisive defeat at Mycale (479 B. C.). To maintain communication open between the Ægean and the Pontus, it must have been of primary importance to assure the freedom and fidelity of the Troad.

The rapid growth of the Athenian state led to its alliance

¹ Herodotus, iii. 90.

² Herodotus, vii. 106.

³ Herodotus, ix. 114, 118.

with nearly all the cities of northwestern Asia Minor, and probably with Assos, although this name does not occur in the remarkable inscription which, dating from between 440 and 436 B. C., records many of the cities belonging to the confederation. Neandria, Kebrene, Lamponia, and even the colony of Assos, Gargara, are on the list; and Assos itself can hardly have been omitted. The object of the union was to carry on the warfare with the Persians, who were finally forced to the convention commonly known under the deceptive name of the "Kimonian peace," at a date subsequent to 449 B. C. By this treaty, whether tacit or written, the freedom of the cities upon the coast was fully secured; no Persian vessels were allowed upon the Ægean, and no armaments within a certain distance from the sea.

With this security Assos may well have had a monumental renaissance, similar to that of Athens, if upon a smaller scale. Thasos, near the Trojan coast, offers a striking example of the material advance made by the Grecian states of the northern Ægean during the decades immediately following the defeat and expulsion of the Persians. Darius had deprived the island of its fleet and razed its city walls; but only twenty-five years later, at the time of its revolt from Athens, Thasos was armed by a strong maritime force, and fully protected by fortifications.

The part taken by Assos during the Peloponnesian war is difficult to determine. Its position between the contending cities of Antandros and Mytilene was certainly not favorable to peace.

Before the end of this unhappy contest between the Greek states the Lacedæmonians had assured the return of the Persian despotism to the coasts of Asia Minor, by their infamous treaties with Darius II. (412 B. C.). The Troad did not pass wholly into the hands of the Barbarians for more than half a

century, being at first subject to the oligarchical government instituted by Lysander immediately after the battle of Aegospotami (405 B. C.).

Even after the peace of Antalkidas (387 B. C.), which delivered many of the Greek cities of Asia Minor to the Persians, a certain banker, Eubulus, maintained himself as master of Atarneus and Assos independently of the authority of Artaxerxes. On his death the eunuch Hermeias, a former confidential servant of Eubulus, succeeded to power over these cities.

Concerning the reign of Hermeias we have fuller information than of any other period of the immediate history of Assos, which is the more fortunate as the city then appears to have been one of the chief seats of Greek refinement and learning. Hermeias, a scholar of Plato, and himself the author of a work (now lost) upon the immortality of the soul, attracted to Assos his fellow-pupils Xenocrates and Aristotle, the latter of whom was related to him by marriage. Aristotle lived in Assos for three years,¹ and we still possess the magnificent pæan composed by him in honor of his benefactor.

Hermeias maintained the independence of Assos until the year 345 B. C., when he was betrayed by a Persian general, Memnon (or, according to Diodorus, Mentor), who, under pretence of effecting a reconciliation between the governor and Artaxerxes III., invited Hermeias to an interview, and sent him, ignominiously sewed up in the skin of an ox, to the Persian capital, where he was crucified.² The general thereupon sent letters, bearing the impression of a seal belonging to the unfortunate Hermeias, to the cities maintaining allegiance, stating that the sovereignty had been amicably delivered over

¹ Compare Fabricius, *Bibl. Gr.* iii. pp. 203, 495, etc.; also Blakesley's *Life of Aristotle*, pp. 35, 44.

² Strabo, xiii. 6ro, and Diodorus, xvi. 52, relate the fortunes of Hermeias, the former giving the most detailed account of the visit of the philosophers to Assos.

to Artaxerxes. Assos again passed into the hands of the Persians without a struggle.

The state had preserved a partial independence for six decades, and was not long to remain under the rapidly declining power of the Barbarians. At the time of the fall of Hermeias, Alexander the Great was of age to receive the instruction of the fugitive Aristotle. Only eleven years afterwards all Mysia was freed by the battle of the Granicus (334 B. C.). From Arrian we learn of the Hellenic reorganization of Phrygia upon the Hellespont after the astounding successes of the conqueror. But the varying political fortunes of the province need not be here recounted, as it passed from hand to hand during the disturbed period of the Diadochi.

Of more concern in the history of Assos was the occupation of the Troad by the Gauls. The fertile valleys of the Scamander and Satnioeis were separated only by the narrow Hellespont and the easily navigable Thracian Sea from these barbarous tribes, who established themselves in the Chersonesus and Macedonia after the death of Alexander. The Troad was exposed to the special ravages of the Trocmæ, who for a time settled upon the Acropolis of the later Ilion.

The repulse of the Gauls was due to the rising state of Pergamon, to which Assos was united in the year 241 B. C. Eumenes and Attalus, refusing tribute, drove the wild tribes to the coasts of the Hellespont, where they continued their ravages until expelled from Ilion by the inhabitants of Alexandria Troas, and finally defeated in a pitched battle near Arisbe (216 B. C.), after having occupied the land for more than sixty years.

Sharing the fate of the powerful monarchy of Pergamon, upon which so much light has lately been thrown by the excavations at Pergamon itself, Assos passed by bequest of Attalus III. to the sovereignty of Rome in 133 B. C. It was

during the period of Roman dominion that the greater part of the lower town of Assos, now in ruins, was built, the long-continued peace favoring the extension of the commerce upon which its existence depended.

A number of the coins of Assos, Adramyttion, and Pergamon, preserved in the numismatical collection of Munich, bear the counter-stamp of an owl, which appears to have been given them during this period to regulate the value of the different mintages and to facilitate their circulation throughout the province. The owl was naturally chosen as a common emblem, the worship of Athena having been predominant in the cities mentioned.

During the wars of the Romans with Mithridates, that ruler occupied Pergamon, the Romans being dislodged from Adramyttion and possibly also from Assos (88 to 85 B. C.).

Mytilene remained in a state of constant revolt between the first and second Mithridatic wars, and the situation of Assos must have led to constant disturbance during those years. Upon the whole, however, the powerful domination of Rome secured a long period of tranquillity to the city.

Assos seems to have become Christian at an early date, perhaps in some measure as a result of the visit of St. Paul and St. Luke, while on their way from Alexandria Troas to Mytilene,¹ but more probably from the proximity of the seven churches of Asia, the influence of which was felt especially at the north. The disciple of St. Peter or St. John, St. Ignatius, — that great upholder of the prerogatives of the clergy, — dwelt for some time in the Troad. Marinus, Bishop of the Troad, was present at the first Œcumenical Council of Nicæa (325 A. D.), and in the lists of the third council of Ephesus (431 A. D.) occurs the name of Maximus, Bishop of Assos.

¹ *Acts of the Apostles*, xx. 13, 14.

The church militant, with the support of the infamous Constantine, destroyed many monuments of the earlier Greek civilization in every part of the country. If the temple of Assos, which had arisen with the freedom of Hellas from Oriental despotism, remained intact until the age of Theodosius, it had then little chance of further escape, — the imperial edicts ordering the closing of all fanes, and permitting any persons to carry off the hewn stones of their walls, to be used in the building of dwellings.

The exposed Troad suffered from nearly every blow inflicted upon the declining Empire of the East. Under Latins, Byzantine Greeks, Franks, Seljukian and Ottoman Turks the Acropolis of Assos was exposed to many attacks, and it is not surprising that the ruins show its fortifications to have been levelled to the ground again and again. Assos, like all the cities of this land, was thus gradually reduced to a miserable village.

Asia Minor was long exposed to the destructive incursions of the Moslems. The authority of the emperors in the land was little more than nominal after the beginning of the eleventh century, and in 1080 the Seljukian Soliman occupied all the cities of the Troad. The unity of God and the mission of the Arabian prophet were preached in the Byzantine church, which had been built with the stones of the archaic Greek temple of Assos. The history of the three centuries which intervened between the first appearance of the nomadic Turkish tribes and the settled establishment of the Ottoman power presents a wearisome repetition of invasions and occupations.

The unreasoning multitudes led by Peter the Hermit passed by the land, not inflicting directly upon it the destruction and misery which everywhere followed in their track. The opportunity created by this disturbance was improved by the crafty

Alexius, who, in enlarging his empire (1097 A. D.), added to it the Troad, which had been wholly estranged from the Christians for a period of seventeen years. Asia Minor was recovered to the banks of the Mæander, and the Seljukian Turks driven forever from the Troad, to which the Christian element was again introduced by colonization from Europe.

The region was more immediately affected by the passage of the third crusade (1189 A. D.), — the Emperor Barbarossa crossing into Asia from Callipolis to Lampsacus, and traversing the land with the last Christian army which has accomplished that feat.

In the contentions between the Franks and Greeks at the beginning of the fourth crusade (1204 A. D.), Adramyttion was taken by Henri de Hainault, brother of the Emperor Baldwin. The extreme sectarian aversion felt between the branches of the Christian church, and still shared by the Levantines of to-day, prepared the way for the final triumph of Mohammedanism.

Exhausted by continual struggles, the Troad fell irrecoverably into the hands of the Ottoman Turks in the beginning of the fourteenth century. The conquest was finally achieved by Orchan ; but his predecessor, Osman, had defeated the Greek fleet at Lemnos in 1288, and soon after had occupied Yenisherî, near the ancient Sigeion.

It is not plain whether Assos was at any time subject to the Gattilusii, the Genoese Princes of Lesbos, who obtained their power in the year 1355 A. D., and, besides holding Lesbos, Tenedos, Ainos, and the four Thracian Islands, appear to have occupied some points of the Trojan coast. Lesbos maintained an administrative independence until 1463 A. D., though it had been tributary to the Turks for almost a century previous. One of the hard conditions enforced upon the Gattilusii by Sultan Mahomet II. was the responsibility

for all marine damages affecting Turkish vessels upon the Asiatic coast opposite Lesbos. The tract specified by the historian Ducas as subject to this condition extended from the river Crimàc¹ to Behrà, and this is the first mention of the Turkish town upon the ancient site of Assos.

The district and civil government of the Troad, which have remained unchanged in all fundamental respects, were instituted by Orchan and his brother Ala-Eddin. The subsequent advance of the Ottoman power into the heart of Europe could have had no influence upon the Asiatic provinces beyond insuring their freedom from the miseries of invasions and sieges.

The long-continued quiet could not bring prosperity to the Southern Troad, deserted by its Christian inhabitants. Under the enervating yoke of the Turks the sparsely populated country languished in lethargic repose, severed from all intercourse with Europe until the advent of the scientific travelers and archæologists of the past century.

For convenient reference in the study of the development and decline of the city, — as illustrated by the monuments, — the chief periods of the history of Assos may be grouped under the following dates: —

Pre-historic occupation of the Troad by Semitic, Phœnician, and Carian colonists	
Pedascus (Assos) capital of the Leleges . . before	1000 B. C.
Date commonly assumed for the beginning of the Trojan war, and sacking of Pedascus by Achilles: B. C. 1193.	
Growth of the Æolic colony	about 1000 to 560 B. C.
At the close of this period, Assos the most important city of the Troad.	

The influence of Assyria felt by all the lands of the Eastern Mediterranean, from the age of

¹ The ancient Caicos.

- Tiglath-Pileser (1120-1100) until that of Assur-bani-pal (668-626).
- Lydian conquest 560 to 549 B. C.
- First subjugation to Persia 549 to 479 B. C.
- Assos a semi-independent state 479 to 345 B. C.
- The influence of Athens paramount before 405 B. C. (battle of Aegospotami); after that date, establishment of an oligarchy by Lacedæmon.
- The rule of Hermeias, at the close of this period, particularly worthy of attention.
- Residence of Aristotle in Assos (348-345 B. C.).
- Return of Persian ascendancy, prepared by Lacedæmonian treaties with Darius II., 412 B. C.
- Second subjugation to Persia 345 to 334 B. C.
- Rule of Alexander the Great and his followers . . 334 to 241 B. C.
- Invasion and occupation of the Troad by the Gauls from 288 until 216 B. C. (battle of Arisbe).
- Assos embodied in the kingdom of Pergamon . . 241 to 133 B. C.
- Empire of Rome 133 B. C. to 330 A. D.
- Assos exposed to the ravages of the Goths during their second and third expeditions (264 and 269 A. D.).
- Early Christianization of the city, and consequent destruction of the monuments.
- Empire of Byzantium 330 to 1080 A. D.
- Period of continual decline.
- Occupation of the Troad by Seljukian Turks . . 1080 to 1097 A. D.
- terminated by the first crusade.
- Continuation of the Byzantine empire by Greeks and Latins 1097 to ab't 1330
- The Troad in the hands of the Franks from 1204 until 1224 A. D.
- Gradual advance of the Ottoman Turks; victory of Osman at Lemnos, 1288 A. D.
- Final occupation of the land by Ottoman Turks, about 1330 —
- The village of Behrâm, upon the site of Assos, visited by Choiseul-Gouffier, A. D. 1785.

The volcanic crater of Assos formed a majestic natural altar peculiarly adapted for a Greek acropolis. The irregular cone is divided, as by a terrace, into two steps, which are in plan so eccentrically related that their fortification walls are united upon the east. The area of the inner enclosure contains very nearly 3,000 square metres. The summit, which is not a perfect plane, rises to the highest point at the extreme northwestern corner. (See Plate 2). The altitude was determined, in the lack of a level, by repeated barometrical readings to be 234 metres above the sea.

Of the most ancient fortification walls of this inner citadel only a vestige remains at *H*, displaying carefully jointed polygonal masonry of comparatively small stones. From the position of these blocks it appears that, at least upon the southern side, the area of the Acropolis has rather been contracted than extended by the later occupants. The mediæval and Turkish ramparts are too rough to deserve particular attention; cut stones were employed only for the sill and jambs of the western gate, still in position. Hastily built of broken blocks embedded in thick layers of mortar, all the masonry bears evidence of the frequent demolition which the citadel has sustained. In digging around these enclosures a number of skeletons were brought to light, with broken weapons, spear-heads, knives, etc. All remained as they had fallen during the attack or defence of the stronghold, with the rubbish of which they were covered.

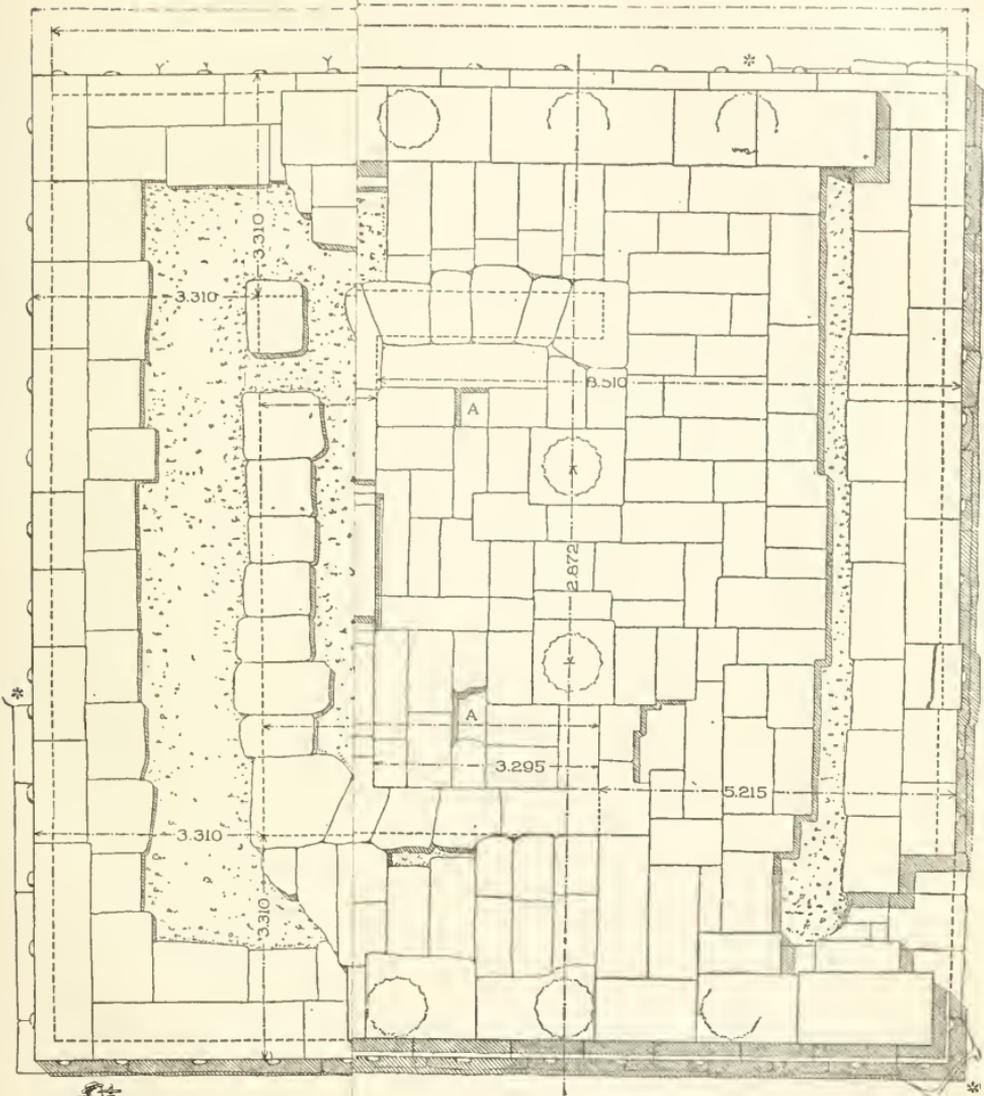
Upon the summit no ruins of ancient buildings were discovered other than those of the temple. How the northern half of the enclosure was occupied in ancient times is not as yet evident. The transverse trench at the north, shown upon Plate 2, though exposing the native rock throughout its course, struck upon no walls antedating the Middle Ages. The surface of the cliff was so uneven and inclined, that if the existence

of any antique structures whatever be assumed upon the northern half of the Acropolis, it is apparent that they must have been founded upon a terrace of earth which has long since been washed away.

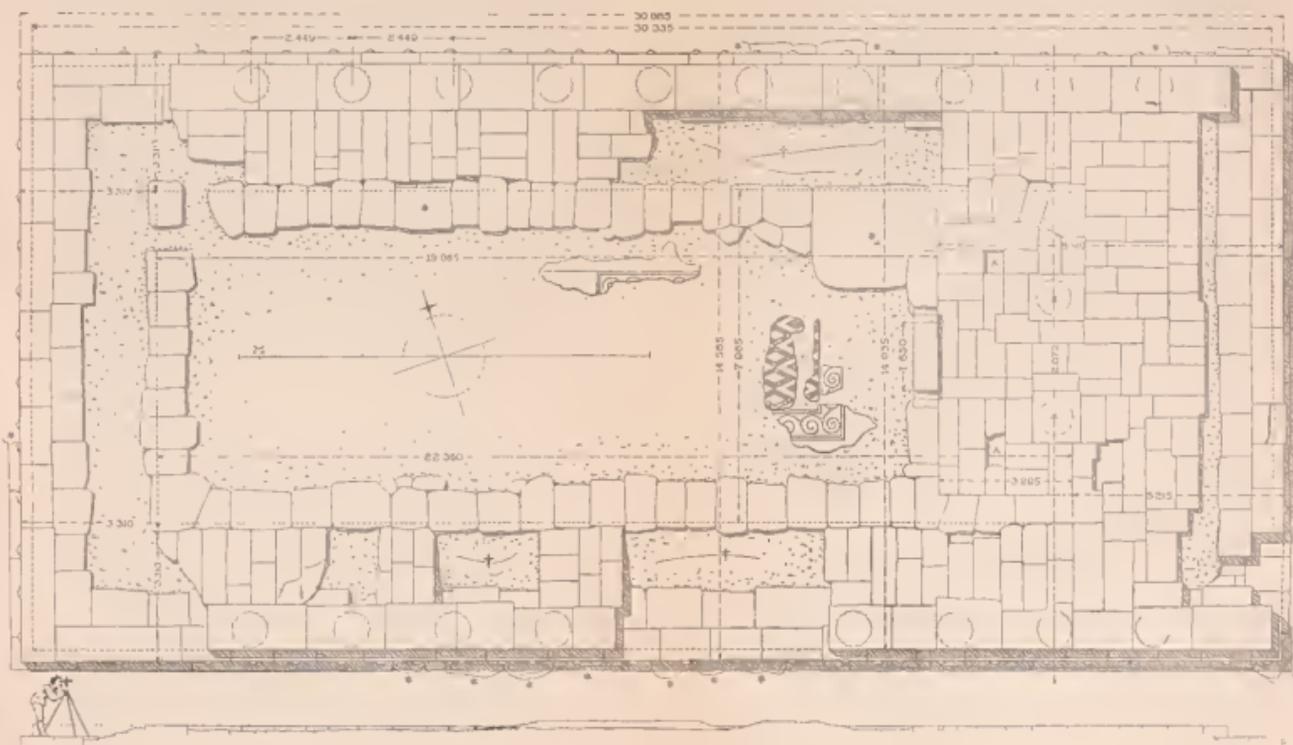
At the south the volcanic rock presented a more even surface; and, by the help of quarrying and filling out with courses of masonry, a level of considerable extent was secured as the site of the chief sanctuary of the city. In all the wonderfully picturesque lands inhabited by the Greeks, no site of a building was more imposing and beautiful than that of the temple of Assos. The peak rose so steep, that, standing within the peribolos of the fane, one could look down into the holds of the vessels in the port beneath, and so high that the foundations of the temple were at an elevation half as great again above the sea as are the finials of the slender spires of Cologne above the Rhine, or the apex of the great pyramid of Gizeh above the Nile.

The constructive details of the temple of Assos, though wisely planned and carefully executed, were, from the nature of the material employed, not of the delicacy observed in the limestone structures of Attica. The carving was bold and effective, but somewhat blunt in the smaller members; the jointing was perfectly close but irregular.

It is a peculiarity of this building that the cliff itself was allowed to remain as the stereobate wherever this was possible, — in two instances, indicated by asterisks upon Plate 7, even rising to the level of the naos pavement, and serving directly as the foundation of the cella wall. A great part of the peribolos enclosure was made by smoothing the summit of the crater, as is evident from the plan; the rock forming almost the whole of the northern and more than half of the western bed. Upon the south and southeast the rock here and there rises to the level of the lower step, these points being indicated



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PLATE 7. FLOOR OF TEMPLE.

on the plate by asterisks. The paving slabs which occupied the interstices have remained only at the north of the fane, the destruction of later ages having reached a greater depth upon the south and east. The natural rock was, however, not permitted to form the stylobate or the lower step, it being here quarried to the level of the surrounding plane.

At the southwestern corner of the building the depression in the rock, to be filled with a substructure of masonry, was particularly deep. A pit sunk at this point to a depth of 1.6 metres showed the even and carefully jointed courses to project slightly, like the well-known foundations beneath the southern steps of the Parthenon. (See the section upon Plate 7.) A firm bedding for the steps, whether cut from the native rock or formed by a substructure of masonry, was thus carefully insured. Notwithstanding the many earthquakes which are known to have affected Assos, the entire crepidoma of the temple has remained unshaken.

The two steps were formed of blocks varying in length from 1 to 3.2 metres of a nearly uniform thickness of 0.28 metre. The lower course was brought into position by knobs left upon the exposed faces of the stones even after the completion of the building. Next to the lateral surfaces of contact, — upon the exposed front and upper edges of the blocks of both steps, — there were also left thin (0.003 m.) and narrow (0.02 m.) projecting fillets, to obviate, in as far as possible, the chipping and defacement of the joints. The obliteration of such legitimate technical makeshifts was contrary to the spirit of Greek workmanship.

The stones were bonded together by iron clamps, cast in lead; no system was observed in this connection, either one or two clamps being employed for each joint at irregular distances from the front edge of the step. The length of the stylobate blocks, at least upon the remaining sides, was not

determined by the width of the inter-columniations, the position of the columns in relation to the joints being entirely irregular. Beneath the shafts, the fillet on the edges of the stones was removed.

Where the pavement of the pteroma and pronaos did not rest immediately upon the native rock, its foundations were not constructed of the courses of masonry deemed necessary for the steps. In three places where the paving blocks of the pteroma were missing, the natural surface of the cliff, uneven and untooled, was exposed by the excavations at a depth of from 0.6 to 0.8 metre. Upon the plan, Plate 7, this rock is indicated by daggers. It was covered with chips of trachyte, evidently resulting from the carving of the building blocks. Upon the firm bed thus provided there rested rectangular paving slabs averaging 0.18 metre in thickness. The system of jointing observed in the pteroma was irregular, though transverse blocks with a width of about 0.57 metre were common.

The level of this pavement was not so high as the general level of the stylobate by 0.015 metre ; and this sinking, taken in connection with the irregular character of the jointing, seems to point to the original existence of a flooring of cement. The stones of the pavement abutted in places directly upon the vertical surface of the wall, as is the case for instance next to the southern antae ; but more frequently the slabs did not meet the irregular foundations of the wall, and the considerable interstices thus remaining could not well have been otherwise filled than by the cement generally employed in primitive Doric constructions. It is natural that no vestiges of such a thin layer of stucco should have survived the exposure of the pavement to the weathering of fifteen centuries, and its occupation as the floor of mediæval and Turkish dwellings.

Upon the rear of the building the pteroma pavement has

been entirely carried off ; upon the front only the course of stones next to the upper step is missing. Those following show a projection in the axis of the entrance, 2.7 metres wide, the purpose of which is not evident, and to which no great importance can be attached in view of the irregular character of the jointing.

Within the pronaos, sinkings at *A A*, Plate 7, expose a lower foundation, which appears to have supported pedestals naturally to be assumed in that situation.

The beddings of the door-jambs are cut upon the lower sill, which makes evident the width of the portal and the thickness of the wall between pronaos and naos.

The interior pavement of the enclosure is preserved in some vestiges of a mosaic formed of cubes of black and white marble. Enough of this remains to insure the restoration of the design, the return being fortunately preserved upon a fragment at the northwest. A border of bands and the broad Greek wave ornament enclosed a field of diamond pattern.

This mosaic rectangle probably occupied that part of the naos, before the sacred figure and the bema, which was open to the worshippers ; its area corresponds, in relative extent, to the similar spaces in the plans of the great temple of Zeus at Olympia and of the Parthenon. It is impossible to determine the age of the mosaic, but it may be supposed to date from a late restoration. The inner pavement of the sanctuary was naturally that part of the building first worn away and most easily replaced. The stones of the mosaic were laid in a floor of cement, which remains to a considerably greater extent than the pattern. Beneath this the entire area of the naos was covered with fine earth, which in part appears to have accumulated during the occupation of the site by dwellings, in part is evidently the original bedding of the floor.

The foundation stones of the cella walls were in position

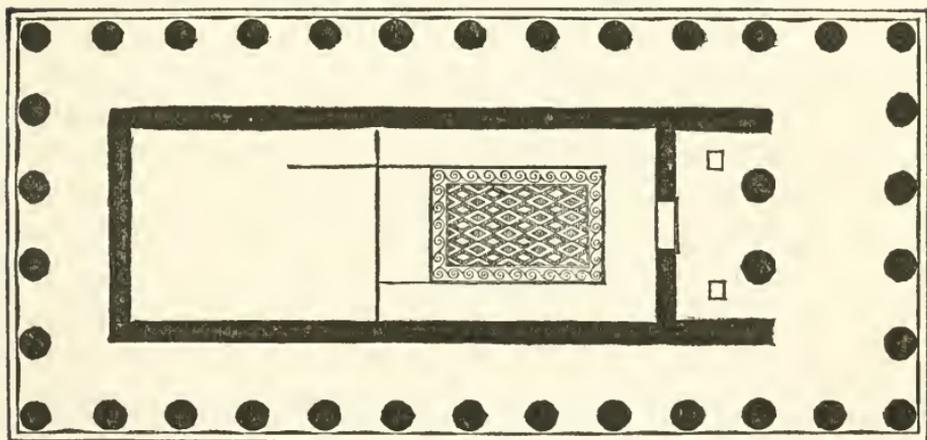
throughout their extent, with the exception of two blocks next to the northwestern corner. These stones were of irregular shape and size, brought to a plane upon the upper surface, to receive the imposed masonry, but otherwise rough and unhewn, since they were hidden from sight, upon their inner edges by the pavement of the naos, upon the outside by the cement floor of the pteroma and pronaos. Upon these blocks, and upon the two exposed surfaces of the natural rock before mentioned as sharing their functions, the outer line of the cella wall was engraved in its entire extent. The temple crepidoma, thus characterized technically as well as ideally as an ἄβαξ, was directly employed by the Greek master-builder as a drawing-board. On the plan, Plate 7, these delicate incisions are given in broken lines, being distinguished from the measurements in line-dot, and the traces of weathering at the bottom of the columns in dots. The lack of this engraving upon the interior points to a less careful execution of the inner surface of the wall, which probably bore a coating of stucco.

The thickness of the walls of the antae was indicated by these lines. In the lack of similar evidence for the lateral walls of the naos these may reasonably be assumed as of equal thickness to the division walls between naos and pronaos. Examples of this manner of construction, where the enclosing walls are thinner than the free-standing antae, though comparatively rare, are still not wanting among the peripteral Doric temples hitherto known.

The position of the foundation stones and the engraved lines upon them display an exceptional feature of the plan; the cella was wholly without an epinaos, the plain wall of its rear being carried across the west at the same distance from the steps as upon the sides.

The two columns of the pronaos in *antis* stood upon square

slabs, considerably larger than the adjoining paving stones, beneath which foundations of masonry probably descend to the native rock. These shafts, protected by the ceiling of the broad front pteroma before them, were but little exposed to the weathering, and the position of their lower drums is distinguishable only by microscopical traces. Ten columns upon the northern side and eight upon the south have left more distinct marks, from which the number and position of the lateral shafts are evident. It is particularly unfortunate that the lack of the stylobate upon both ends has rendered it impossible to ascertain the various widths of the inter-colum-niations of the front and rear. With this single exception, which has been hypothetically made good according to the striking analogy of the Theseion, the restored plan, Plate 8, is accurately determined from the remains.



FFC

PLATE 8.

Not one stone was found in position above the stylobate. The restoration of the superstructure was consequently a work of considerable difficulty, requiring the most careful search for important blocks. The drums of the columns, scattered upon all sides of the Acropolis and built into the enclos-

ing fortifications, varied in length from 0.6 to 1.4 metres. To ascertain the height of the shaft several hundred measurements of these blocks were necessary, their comparative shortness being unfavorable to the investigation.

A difference of 0.02 metre was observed in the lower diameters, but the great number of bottom drums rendered the given average trustworthy. The twenty capitals remaining upon the site allowed a similar calculation for the upper diameter of the shaft, of which the individual variation was nearly as great. By measuring each diameter of the intermediate drums eight times from arris to arris, the proportionate diminution of every truncated cone was ascertained.

The results thus obtained, contrary to expectation, averaged exactly the same for upper as for lower drums ; thus proving that the columns were without the entasis, which would have required a considerably greater diminution above than below one-third the height of the shaft. This lack of entasis is perhaps explicable by the small dimensions of the temple and the hard and coarse nature of the material of which it was built. According to the statement of Durm,¹ the columns of Corinth, which are in other respects similar to those of Assos, are also without entasis, and it is possible that this refinement was not generally introduced until a more advanced period in the development of the Doric style. It has been mentioned, that, owing to an injury to the levelling instrument, the question of the curvature of the horizontals could

¹ Josef Durm, *Die Baukunst der Griechen, des Handbuchs der Architektur zweiter Theil*; Darmstadt, 1881; p. 63. The author evidently refers to original investigations, as the older authorities upon the ruins of Corinth — Blouet, *Expédition de Morée*, vol. iii., and Stuart and Revett, *Antiquities of Athens* (accessible to the present writer only in a translation) — do not refer to the entasis directly. Krell, *Geschichte des Dorischen Styls*, on the other hand, states that an entasis existed, but whence his information is derived is not stated.

not be definitely determined during the past year ; but so far as the observations went the stylobate appeared perfectly level, — any deviation as great as 0.01 metre would have been readily recognized by the reversed readings. This apparent neglect to counteract the optical deceptions of mathematically exact lines agrees entirely with the omission of an entasis, which was designed for a similar object to that of the curvature.

The proportionate diminution determined by the difference between the lower and upper diameters of the shaft fixed the height of the column. The given dimension can hardly vary more than 0.08 metre from the truth.

The lower surface of the bottom drum generally displayed the slot cut for the centre peg by which it was turned upon the customary lathe. In some instances this sinking had been obliterated by the shortening of the block. For if the total height of the several drums intended to be fitted together to form a shaft was found before their erection to be too great, it was at the base alone that a decrease could be effected, — the surfaces between the drums requiring the steadying centre presently to be described, and the juncture with the capital, like all the intermediate joints, not allowing any change of diameter.

The upper surface of the lower drum, and both planes of every one superposed (with the exception of the uppermost, on which the capital rested, where the slot of the turning centre peg remained), showed a hole cut for a cylindrical pin of wood about 0.045 metre in diameter, which served as an axis for the grinding of each stone upon the one next beneath. In the perfected Doric buildings of Attica this pin was enclosed, and worked in cubical boxes of the same material, cemented into the opposite drums with red lead. In the temple of Assos the solicitude for accurate juncture had not been

carried so far, the wooden axis bearing directly upon the stone, in the centre of which a cylindrical hole was cut to receive it.

As can be seen from the sketch, Plate 9, the plane surfaces of the drums were so tooled as to present points of contact only in a concentric band, about 0.1 metre broad, upon their edges, according to the practice universal in all Greek architecture of good period.

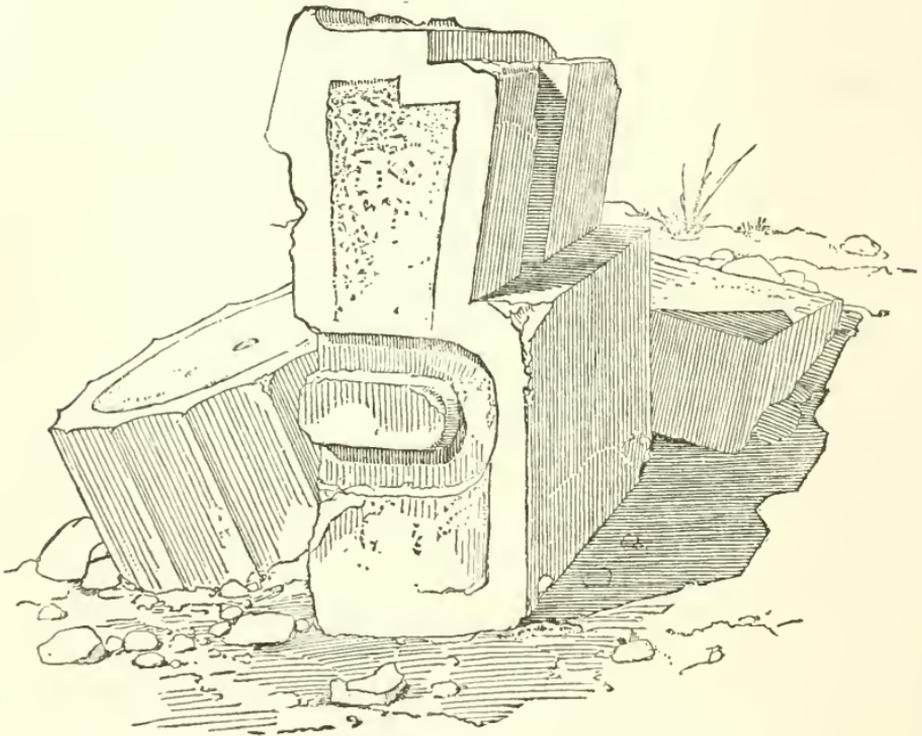


PLATE 9.

The shafts of the peripteros had sixteen channels, those of the pronaos eighteen. It is an inexplicable and unique arrangement of the channelling upon the columns of the temple of Assos that arises, not hollows, were in the axes of the plan, and in line with the faces of the abacus. This peculi-

arity was evident from the weathered marks of the lower drums upon the stylobate, as well as from the termination of the channelling upon the necking of the displaced capitals.¹

It is evident that with their eighteen channels the shafts of the pronaos presented a hollow in the line of their lateral axes better fitted to receive the transverse bars of the *grille*, customarily employed as a barrier between pteroma and pronaos, than the sharp edge of an arris. Still, it should be remarked that upon the single drum of eighteen channels which was found during the excavations, no traces of such a metallic barrier were to be detected.

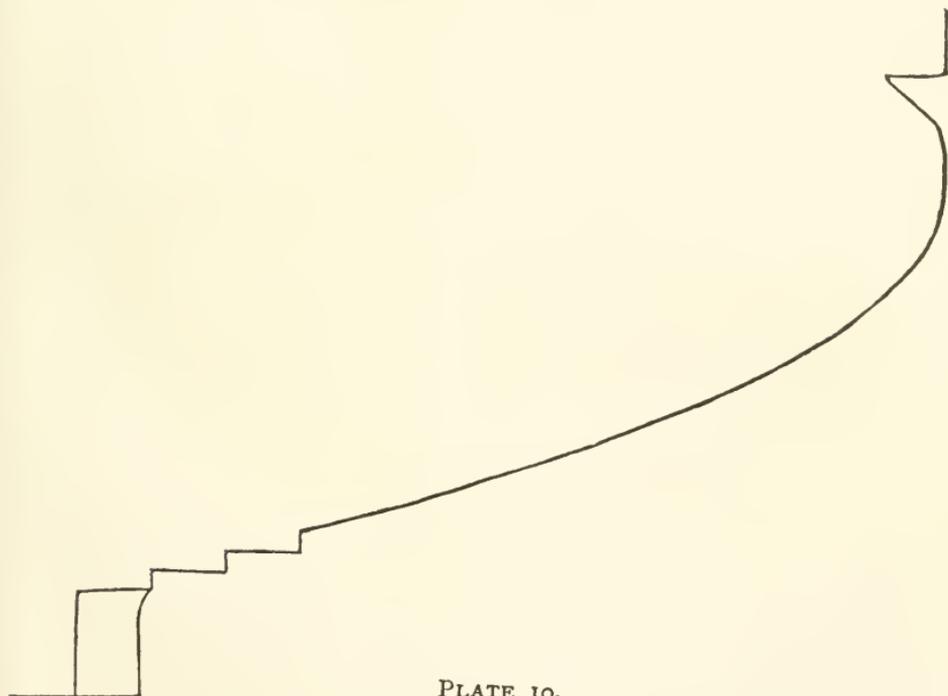


PLATE 10.

From the lower surfaces of the capitals it appears that the juncture between them and the upper drum of the shaft formed an incision. The channellings, as is shown in the outline of the necking and echinos, Plate 10, were terminated

by direct intersection with the lower annulet. The three annulets projected in nearly horizontal planes, in some instances the first slanting slightly upward from the shaft, while the two following were almost imperceptibly under-cut. The outline of the echinos is of great vigor and beauty, the upper termination, hidden from the eye, being generally treated as a straight line, meeting the lower surface of the abacus at an angle of forty-five degrees. The variations of the individual capitals are chiefly noticeable in the diameter of the surface adjoining the upper end of the shaft, and in the width of the abacus. The height of the necking is one of the most constant dimensions of the structure.

Not one surely recognizable block of the cella wall remains upon the site. The identification of the stones composing the most ancient portion of the neighboring Byzantine church as belonging to the walls of the temple is more than probable, but leads to no result. Among the blocks lying near the temple was one which may prove to be the inner lintel of the naos door, and another which seems like a fragment of a capital of one of the antae; but this remains to be determined. From the marks upon the foundation stones it is evident that the wall throughout its extent was without projections in plan, and hence probably plain upon its surface.

The epistyle beams, as in the Parthenon, were triple,—an exceptional number for so small a construction, the entire member measuring only 0.82 metre in thickness. It is exactly as broad as high, while the epistyle of the Parthenon, of more than double the absolute dimensions, is one-third again as broad as high. The middle beam did not occupy the entire height of the epistyle, the outer blocks being so thickened upon the upper half as to meet above the block between them. (See the section, Plate 11.) It is difficult to advance a satisfactory explanation of this peculiar con-

struction. The saving effected in the weight of the facing blocks was more than counterbalanced by the additional labor required to cut stones, naturally splitting to parallel and rectangular planes, into the irregular shape thus determined ; and the difficulty of assuring exact joints upon the soffit was rather increased than lessened by the duplication of the surfaces of contact.

The outer face of the epistyle, being sculptured with reliefs requiring an architectural frame, was bordered upon the bottom by a band which is not found in any other Doric building. *Tænia* and *regulæ* were of comparatively slight projection, the latter being without trunnels. The plain epistyle blocks without lower border, found during the investigations, probably belonged to the inside.

That both the outer

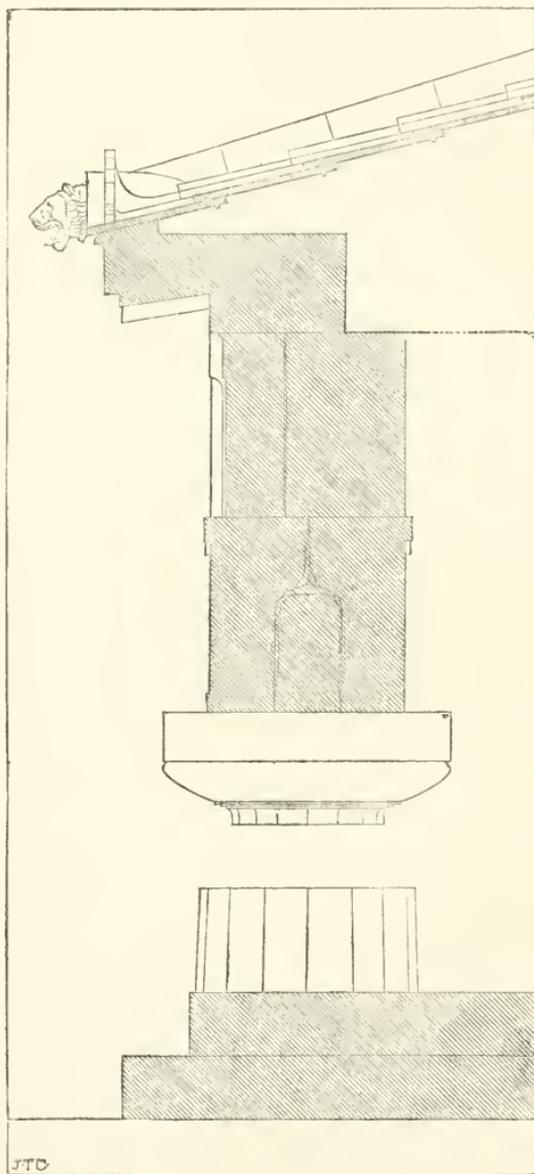


PLATE II

and inner beams of the epistyle were dowelled to the upper surfaces of the capitals is evident from the swallow-tail sinkings upon the ends of their soffits. These marks, occurring upon the fronts of the sculptured epistyle, present the most conclusive proof that these remarkable blocks were above the columns and inter-columniations, and not upon the cella wall, where a projection as great as that of the abaci could not have been provided by any continuous moulding.

The edges of the triglyphs were under-cut so as to afford a reveal, into which the thin slabs of the metopes, whether sculptured or plain, could be slid from above. A remarkable variation is noticeable in the width of the triglyphs, which appear of two dimensions, — 0.52 and 0.56 metres. That the narrower blocks were situated above the columns is evident from the fact that the corner triglyphs, three of which were fortunately found, were of the smaller width. Like the outer epistyle, the sculptured metopes were provided with a base band. The slightly projecting band which crowns triglyphs and metopes was of the same width over both members, thus forming a continuous line along the upper part of the frieze. The metopes were further terminated by a narrow and delicate Lesbian cyma,—a crowning and connecting member similar to the astragal occupying this position upon the Parthenon.

The mouldings indicated by Texier as existing above the frieze are wholly imaginary. The increased projection of the cornice arising from their introduction would have given to the corner mutules a disproportionate width, which would have been without a parallel in the style. Corner blocks of the corona proving the non-existence of the moulding were found among the ruins, while the constructive impossibility of interposing a continuous band of trachyte only 0.106 metre thick between the mighty stones of the Doric entablature is evident from the French restoration itself.

The general arrangement of the cornice was such that the corona blocks extended from centre to centre of the triglyphs. Reposing directly upon the frieze, the stones were so cut as to provide a bed of nearly two-thirds the thickness of the entablature. Upon the ends of the blocks U-shaped grooves, like those noticeable in Selinus, Ægina, and other Doric sites, were cut to receive the ropes by which they were lifted to their positions. (See the fragment of a corona block shown on Plate 9.) An exact jointing was secured by restricting the surfaces of contact to a band upon the edges, like the concentric bands on the drums of the columns.

The soffit of the corona was so divided that the mutules above the metopes upon the side of the building were only about three-fifths as broad as those over the triglyphs. Upon the front the greater width of the inter-columniations increased this proportion to seven-eighths; and a similar increase was noticeable next to the corners of the sides, where the triglyph was not in the axis of the column. Like the *regulae*, the mutules were without trunnels (*guttæ*).

Behind the triglyphs and metopes there probably was placed a plain backing as an interior frieze, upon the upper surface of which, not occupied by the corona blocks, reposed the ends of the pteroma ceiling-beams. A coffered stone, which possibly belongs to this part of the temple, is built into the wall of the Byzantine church, with its soffit outward. As may be seen from the sketch, Plate 23, it is so high above the ground that it was not possible to measure it without ladders, which were not at hand. The block is evidently less than 2.43 metres long, and consequently shorter than the clear span of the pteroma ceiling,—so that, if it be assumed to belong to the temple at all, it indicates a complicated system of transverse beams.

One of the three corner corona blocks which were found

gave the approximate angle of the gable, while the discovery of one fragment of the inclined gable corona determined the reveal of the tympanon and the character of its border. The soffit of this important cornice was under-cut in the usual proportion, the projection being separated from the upright tympanon veil by a Lesbian cyma.

The entire structure thus far considered was built of the second trachyte of the Acropolis. In the lion's head of the corner gutter the first appearance of another material is noted, that gargoyle being of a lighter and softer stone than the trachyte, — like it of volcanic origin, but stratified by the action of water. The upper half of this fine head (Plate 12) was one

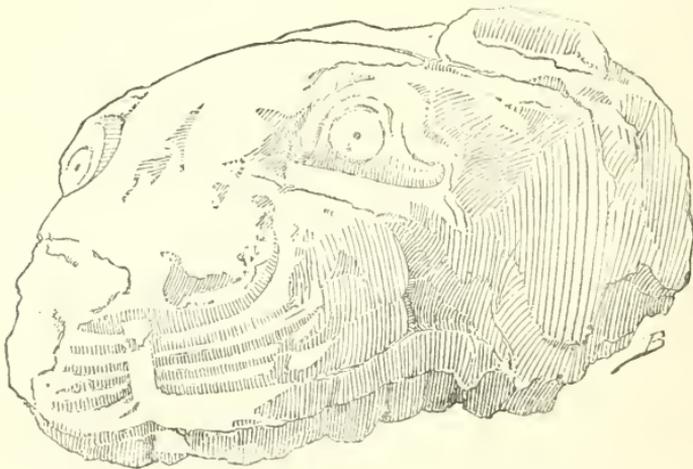


PLATE 12.

of the most interesting fragments discovered during the year. It displays, even more strikingly than the sculptures of the epistyle, the round and flat, yet sharply detailed, forms peculiar to the empaistic work abundantly produced upon the eastern shores of the Mediterranean during the ages of Phœnician influence. The form of the teeth, the ribbed roof of the mouth, the angular furrows which suggest the whiskers upon the upper lip, — in short, every detail of the head shows a

power of animal characterization which corresponds with the masterly treatment of the lions and boars of the reliefs.

The general dimensions of the crowning gutter (sima) upon the fronts were evident from this gargoyle, and the charac-

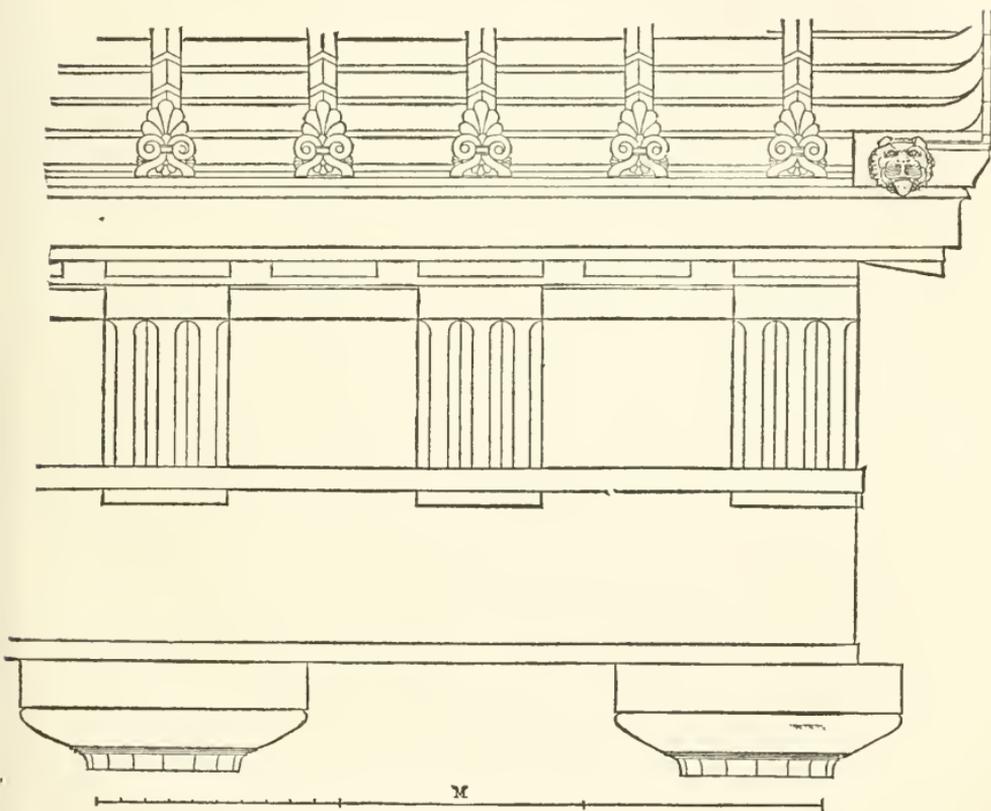


PLATE 13.

ter of the side cornice was similarly determined by the discovery of lower tiles (*imbrices*) and an antefix. The general arrangement of the roof was thus shown to resemble closely that of the Parthenon and of the temple of Rhamnus.

The terra-cotta tiles bore the black glaze observed upon such remains at Olympia, Argos, and Mycenæ, but not, so far as the writer is aware, upon any of the older examples of Sicily.

Only small fragments of the lower plates were found, and no remains whatever of the joint-tiles (*calypteres*). The upper end of the former was provided with a projecting band to hook on to the timbering of the roof. In the detailed restoration of the roof (Plates 11 and 13) the lower tiles have been assumed to extend from axis to axis of the mutules, with an ordinary width of 0.61 metre. This dimension is not great, compared with the tiles elsewhere employed for Greek temples, which often measure 0.8 by 1.1 metre, and in some instances even attain a length of 1.2 metre. The width of the tiles at Assos appears to be determined by the existence of antefixes, which could hardly have been otherwise situated than above each mutule. In all Doric temples the tiles appear to have rested directly upon the rafters, there being no cross slats; the assumed agreement with the mutules would confirm the supposed derivation of the entablature and roof from a wooden prototype.

The broken terra-cotta antefix which was found, displayed the rich red-and-black of the archaic Doric polychromy, and showed the form of these terminations of the joint-tiles. No information was obtained in regard to the acroteria, the ridge and joint tiles, and the terra-cotta gutter of the fronts.

The following table presents the chief dimensions of the building:—

	Metres.
Length of lower step	30.885
Breadth " "	14.585
Allowance for width of each step . . . average	0.275
Length of stylobate	30.335
Breadth " "	14.035
Exterior of cella, length	22.360
" " " breadth	7.965
Enclosing walls of naos, thickness . . . about	0.6
Walls of antæ, thickness	0.660
Door of naos, breadth	1.650

Interior of naos, length	about	17.865
“ “ “ breadth	about	6.765
Total width of pteroma, sides and rear		3.035
“ “ “ “ front, before antæ		4.940
Columns from centre to centre, sides		2.449
“ “ “ front corners, assumed about		2.5
“ “ “ to centre, front, “ “		2.7
Lower diameter of shaft	average	0.915
Upper “ “ “	“	0.628
Height of steps	“	0.280
“ “ column	calculated about	4.78
“ “ shaft	“ “	4.3
“ “ capital	average	0.480
“ “ epistyle		0.820
“ “ frieze members		0.784
“ “ corona		0.416
Total height of order, from pavement to upper surface of corona	calculated about	7.36

In comparing these dimensions with the intention of recognizing the unit of measure employed in the building, it is noticeable that the width of the side and rear pteroma is as nearly as possible one-tenth of the length of the stylobate. This relation of the most important divisions of the plan is so strikingly exact as to exclude the assumption of a coincidence. It is hence extremely probable that a system of decimal feet was employed, or that 3.0335 metres contains an entire number of the original unit of measure.

If the plan be supposed to be 100 feet long, and the pteroma 10 feet, a foot of 0.30335 metre would result, — a dimension varying but very slightly from the Greek foot as determined by M. Aurès (0.307 metre),¹ by Don Vasquez Queipo (0.30864 metre),² and by Boeckh (0.308211 metre).³ In this case the

¹ *Étude des Dimensions du Grand Temple de Pastum*, p. 4. Paris. 1868.

² *Essai sur les Systèmes métriques et monétaires des anciens Peuples*. Paris. 1859. Tome i., p. 387.

³ Deduced from Boeckh's estimate of the Roman foot by Charles Eliot Nor-

thickness of the cella wall would appear as 2 feet, of the antæ walls as 2.2 feet, the width of the naos door as 5.5 feet, the lower diameter of the column as 3 feet, etc. A suggestion, perhaps more plausible, has been made by my friend Richard Bohn, architect of the excavations at Pergamon, that the dimensions were respectively 9 and 90 feet, of a consequent length of 0.337 metre. The breadth of the naos interior would thus appear as 20 feet, its length as 53 feet, etc.

For those not accustomed to the metric system it may be stated that one hundred English feet equal 30.479 metres, or less than six inches more than the length of the stylobate.

To serve in comparison with the useful table compiled by Krell, in his *Geschichte des Dorischen Stils*, the proportions of the temple of Assos may be given as follows:—

Distance from axis to axis of the side columns, measured by halves of the lower diameter	5.35								
Width of the side and rear pteroma remaining between the inner side of the peripteral columns and the cella wall, measured by the lower diameter	2.31								
Semper's norm ¹ for the sides	$\frac{16.0}{10.45 + 4.40 = 14.85}$								
Scale of heights, that of the frieze being assumed as 10: =	<table> <tbody> <tr> <td>column</td> <td>61.0</td> </tr> <tr> <td>epistyle</td> <td>10.5</td> </tr> <tr> <td>frieze</td> <td>10.0</td> </tr> <tr> <td>corona</td> <td>5.3</td> </tr> </tbody> </table>	column	61.0	epistyle	10.5	frieze	10.0	corona	5.3
column	61.0								
epistyle	10.5								
frieze	10.0								
corona	5.3								
Height of column in lower diameters	5.23								
Proportion of height of capital to height of column . . .	1 : 9.96								

ton, in *The Dimensions and Proportions of the Temple of Zeus at Olympia*, in the *Proceedings of the American Academy of Arts and Sciences*, Boston, 1877, p. 150.

¹ Compare Gottfried Semper, *Der Stil*, etc. *München*, 1863, vol. ii., p. 411. If three inter-columniations, from axis to axis of the columns, be taken as the base of a rectangle, the side of which is equal to the height of the order, — calculated from the upper edge of the stylobate to the summit of the corona, exclusive of the gutter, — the normal proportion of plan and elevation, or as it is concisely termed the "norm" of a temple, is graphically represented. When expressed in figures, one-half the lower diameter of the shaft serves as the unit, the dimensions of the column and entablature being given separately.

Number of channellings :	{ peripteros	16
	{ pronaos	18
Number of annulets		3
Number of necking incisions		1
Proportion of height of capital to width of abacus		1 : 2.5
Proportion of width of abacus to space between the abaci of the side		1 : 1.04
Proportion of the height of abacus to the height of echinos and rings		1 : 0.95
Height of capital divided by one-half the upper diameter of shaft		1.63
Width of abacus divided by one-half the upper diameter of shaft		3.72

The general untrustworthiness of the *Description de l'Asie Mineure* has already been referred to. The description of the temple of Assos, presented in that work, appears almost worse than valueless.

The remains now unearthed show the orientation of the building to have varied considerably from the east to the south ; Texier places it thirty degrees to the north of its true direction. The two steps are increased to three upon the French elevation, to four upon the fronts of the plan. The disposition of the plan given in the fine steel engraving, with its double dipteral ranges of columns upon the east, and the epinaos in antis upon the west, must have been conceived by the ingenious author after his return to Paris. The width of the building is given on the plan as 23, on the elevation as 13 metres. The excessive, sack-like entasis of the shafts, which has given rise to many wild theories, did not exist. The striking arrangement of the channel arrises in the axes of the building was overlooked, while important members, which never existed, were added to the entablature, these being, with unparalleled effrontery, scaled to the millimetre, as if accurately measured ! The projecting mouldings inserted between frieze and corona are wholly at variance with the char-

acter of the style. It is needless to multiply illustrations of this manner of reporting scientific investigations.

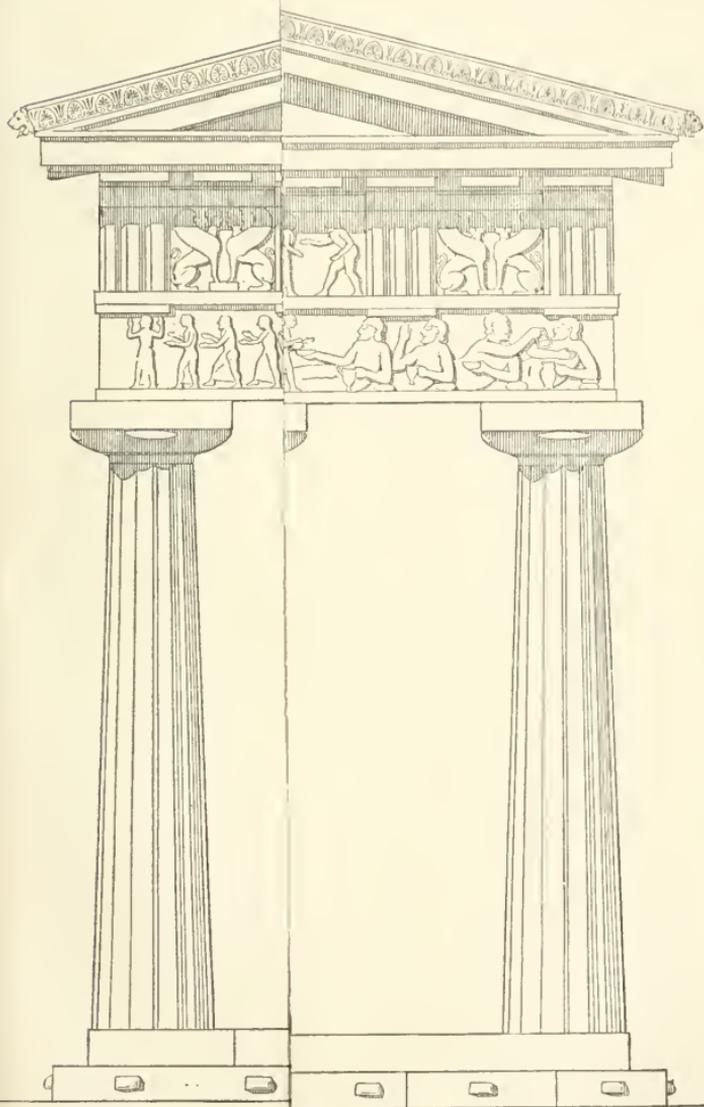
Such being the character of Texier's account of the temple, and it having been, up to this time, the only published source of information, the result of the work of the present Expedition, as recorded in these pages, may fairly rank as the direct recovery of one of the most important monuments of the Doric style, that noblest and first-born offspring of Greek architectural genius. (See Plate 14.)

The temple of Assos is the only known Doric peripteros in all Asia Minor, with the exception of the fane of Athene Polias,¹ recently excavated at Pergamon, which was built at a much later period. The historical interest of the temple is evident from the attention devoted to it by every writer upon the development of Greek architecture and sculpture, even while the building has been most imperfectly known.

Its age appears more accurately to be determined from its architectural characteristics than from the archaic but provincial reliefs sculptured upon its epistyle. It is the writer's belief that the building of the temple of Assos is to be referred to that activity spoken of in the historical sketch as affecting all the lands of the northern Ægean immediately after the battle of Mycale and the expulsion of the Persians. The arguments for this view can be little more than indicated in this preliminary account. While the temple shows many signs of having been built during a period of development previous to the canonical determination of every detail of the style, yet its general disposition, — especially in the decisive points of the axes of the plan, and the relative dimensions of the elevation, — is far more advanced than that of the archaic Sicilian temples.

The provincialism of Asia Minor during the first half of

¹ *Der Tempel der Athena Polias zu Pergamon*, von Richard Bohn. Berlin. 1881.



J.T.C



PLATE 14. FRONT OF TEMPLE, RESTORED.

the fifth century B. C. amply accounts for the appearance of primitive traits in the temple of Assos at a time when the architecture of Attica had reached its full development. The Asiatic provinces, which for six decades had suffered from Lydian and Persian occupation, bore in the year 475 B. C. a somewhat similar artistic relation to European Greece to that which the eastern shores of the Adriatic bore to the western during the later ages of the Roman Empire. It was not to be expected that the full advance displayed in the temple of Ægina, or the Thescion, should be shared by contemporaneous buildings in Mysia.

Even from this point of view, however, the temple of Assos must be classed as one of the more primitive examples of that phase of the Doric style, designated by Semper as the "fully developed archaic." The only other peripteral temples in which the epinaos is known to have been omitted are those extremely ancient monuments at Selinus, designated as the temples *C*, *D*, and *S*, and the fragmentary remains near Cadacchio upon the island of Corfu. The epinaos, unknown in the primitive temple in antis, seems to have had no purpose connected with the service of the temple, there being no entrance through it to the naos, so that its introduction may be regarded as a concession made to the formal symmetry of the edifice at a time when the general arrangement of plan was still undergoing development.

The constructive character of the temple of Assos and the irregularity of its details show that the building antedates the time when the entire fane, down to the most inconsiderable members, was laid out according to a systematized canon. The individual variations, noticed in its different parts, seldom occur in later buildings, but are sufficiently common in archaic temples. The variation of 0.09 metre in the lower diameters of the columns of the great temple of Zeus at Olympia is pro-

portionately greater than that of those of the temple of Assos. The sculptured epistyle is entirely exceptional in the Doric style, and points to Oriental reminiscences of great antiquity. The awkward division of the entablature in such a manner as to form fractional mutules above the metopes finds a striking parallel in the most ancient temple, *C*, of Selinus.

The example of the columns upon Cape Sunion proves that the occurrence of the sixteen-channelled shaft is not necessarily an indication of great age, — as might be supposed from its appearance in Selinus and Olympia, — being at Sunion, as perhaps at Assos, due to the great elevation of the temple above the sea and neighboring plains. Still the abnormal arrangement of the arrises in the axes of the plan is so primitive, that, taken together with the number of the channels, it affords an indication either of the remote date of the shaft or of a provincialism in its treatment, the exact effects and limits of which are difficult of determination. At all events the æsthetic object and the technical significance of the channelling were imperfectly appreciated at Assos.

The outline of the capital, always of great importance in the determination of the age and relative position of monuments of the Doric style, indicates a decided advance upon the forms of what has been called the lax archaic period. The Sicilian apophyge has been entirely given up, the simplest possible juncture of necking and annulets being effected. On the other hand, the great angle formed by the lower echinos with the shaft is still retained, and the general character of the curve is similar to that of the oldest capitals. The annulets are not as yet organically connected with the echinos. (See Plate 10.)

Arguments tending to prove the primitive character of the temple might be derived from the lack of trunnels upon the regulas as well as upon the mutules, from the extremely blunt forms and slight projection of all the band mouldings, nota-

bly of the taenia, and from the archaic colors displayed by the terra-cotta antefix.

The most trustworthy and conclusive results are to be obtained from a comparison of the table given above with the known proportions of other Doric temples. The height of the column expressed in lower diameters shows the temple of Assos (5.23) to stand between the temples of Athena (4.27) and of Artemis (4.29) at Syracuse, of the temple at Corinth (4.32), of the temple (*D*) at Selinus (4.50), etc., on the one hand; and the Theseion (5.62), the Parthenon (5.47), and the temple of Ægina (5.30), on the other. The relation of Semper's norm for these buildings is particularly interesting, but the statement of it is of too great length to be given here. A further comparison of proportions, leading to the same result, is best made between the heights of epistyle, frieze, and corona, the width of the pteroma, and the relative diminution of the shaft.

A remarkable similarity of absolute dimensions is noticeable between the temple of Assos and the Theseion. In the Theseion, for instance, the breadth of the stylobate is 13.816 metres, in the temple of Assos 14.035 metres; in the former the breadth of the cella upon the exterior is 7.928 metres, in the latter 7.965 metres. The number of columns upon front and sides, the orientation south of east, in neither case necessitated by the configuration of the ground, and even the exceptional reduction of the steps to two, are in both temples the same. While the plans of the archaic monuments of Selinus show a helpless irregularity of general arrangement, the temple of Assos presents a developed disposition of parts attainable only after many experiments.

From the situation of the pronaos columns, exactly in the lateral axis of the third shafts of the side, the existence of transverse lintels above the pteroma is rendered almost cer-

tain. As may be seen from Plate 8, the pteroma before the pronaos was thus provided with an independent ceiling in the entire breadth of the building, the space being thus separated from the side colonnades, and characterized as a vestibule, — in so small an edifice an arrangement of great advantage to the general composition. From a review of the plans of peripteral Doric temples, it is evident that such an advance could not have been made until a comparatively late period. This peculiarity, observed elsewhere only in the Theseion and in the temple of Sunion, is one of the strongest arguments against the assumption that the temple of Assos was built before the Persian wars. The relative depth of pronaos and naos; the width of pteroma and cella; the arrangement of gutters, gargoyles, and antefixes; the black glaze of the tiles, — all point to a perfection of the Doric style not to be expected on the coasts of Asia Minor earlier than the date which has been assumed for the construction.

That the temple of Assos, the chief building of the city, was consecrated to Athena there can be but little doubt, in view of the invariable occurrence of the head of that deity upon the obverse of all the coins of Assos, excepting those of the later Roman Empire, when the portraits of the rulers were substituted. This supposition is rendered almost a certainty by the mention of “the pure virgin whom our Fathers worshipped” upon the bronze inscription, discovered during the past year, which records the oath of allegiance taken by the Asians upon the accession of Caligula. The worship of Athena was universal throughout Mysia. Even in the Homeric legend, her temple was the principal sanctuary of Troy; she was the patron of Pergamon, Adramyttion, and other cities in the neighborhood, as well as of Assos. The only other Doric temple of Asia Minor, — the building upon the Acropolis of Pergamon, which has already been referred to, — was, like

the far more ancient temple of Assos, dedicated to Athena Polias.

It is one of the most interesting, and at the same time one of the most complicate, problems of classical archæology to determine in what measure Greek art, which in so short a time rose to such marvellous perfection, was founded upon the architecture and sculpture of older and foreign races.

A most valuable addition to our knowledge of archaic and advancing sculpture has been made during the past year by our discovery of eleven fragments forming eight complete reliefs of the carved epistyle and metopes of the temple of Assos. These sculptures illustrate, as does no other series of connected works, the gradual Hellenization of Oriental types and artistic methods.

A thorough consideration of these discoveries must necessarily treat in detail of the seventeen fragments (thirteen reliefs) of the series which were removed, in 1838, to Paris, and is reserved for another publication of the Institute.¹ The sculptures from Assos in the Louvre have for over forty years attracted the attention of archæologists and historians of art, and the literature concerning the significance of their representations, and their artistic character, has become too extensive to be fitly treated here. Even the story of their removal, by Raoul-Rochette, is an instructive illustration of archæological conditions during the first half of this century, and of the remarkable career of Reshid Pacha, the powerful and cunning minister of Sultan Mahmoud II.

¹ The published illustrations of the sculptures from the temple of Assos, now in the Louvre, have been referred to on page 11, note 1; they have been reproduced by wood-cuts in several histories of Greek art. In a future volume the blocks in Paris will be shown in new drawings from the originals, uniform in size and treatment with the drawings made from the newly discovered reliefs.

The original position of the sculptured epistyle has been determined during the past year to have been upon the peripteros, and the new blocks go far to disprove the assumed explanation of the representation upon the principal relief in Paris as the combat of Proteus with Menelaus (Texier), or with Aristæus (Clarac), rather confirming the interpretation of it as a scene from the myth of Heracles, either that hero's struggle with Triton (Friedrichs, Overbeck), with Nereus (Brunn), or with the marine monster to which the daughter of the Trojan king Laomedon was exposed,—the last identification being suggested by the writer, because of its local character.

The reliefs were indeed published by Texier as carved upon the epistyle of the peripteros; but the only argument advanced in support of this fact,—namely, that no fragment of an unsculptured epistyle was to be met with among the ruins,—has been proved to be a misstatement,¹ and it was more natural from æsthetical considerations, and the analogies of other temples, to assign the zophoros to the cella wall. That this, however, was not its position has been made evident by the additional thickness given to the top of these lintels, and by the swallow-tailed dowel-holes upon the ends of their soffits, where the metallic clamps fastened the stones to the upper surfaces of the projecting abaci. In the case of all the Assos sculptures in the Louvre, these indications have been effaced by the sawing of the stones to thin slabs, that they might the more readily be attached to the wall of the Museum.

The statement in the *Description de l'Asie Mineure*, that the thickness of the reliefs was uniformly equal to one-half the lower diameter of the peripteral shafts, must be regarded

¹ Compare the writer's *Notes on Greek Shores*, p. 153.



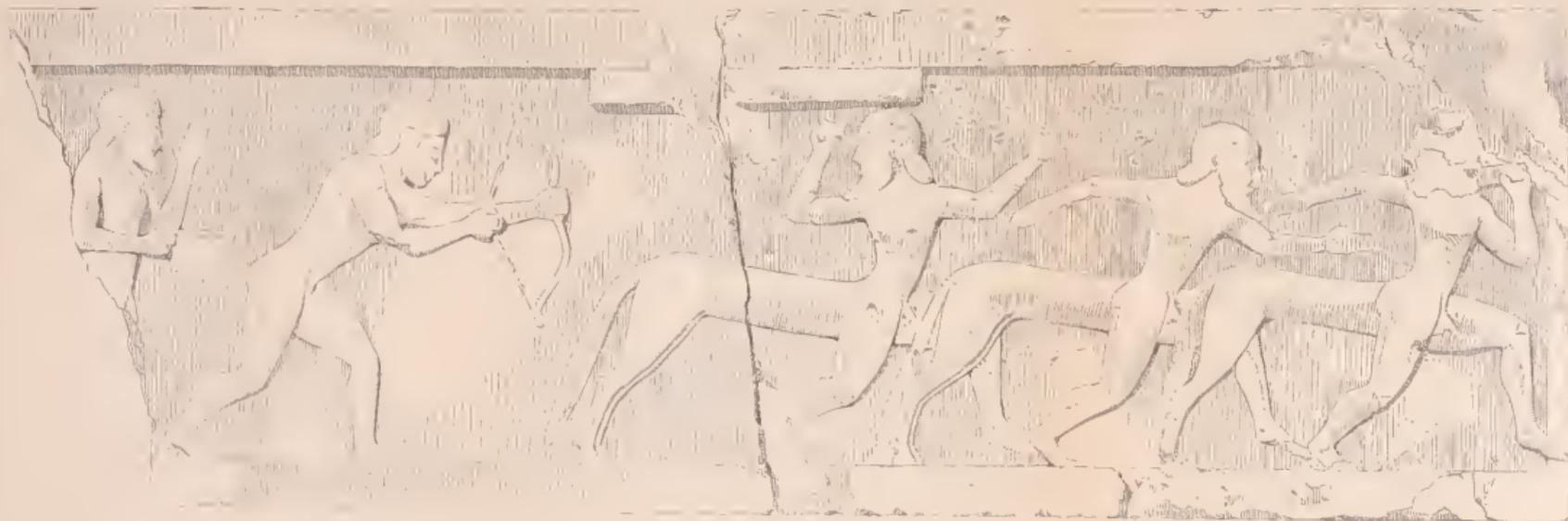


PLATE 11. HERCULES AND CENTAURS.

as deliberately false ; it was thought necessary to prove the position of the blocks upon the columns, and the tendency of Texier to distort facts in favor of his theories has been already pointed out.

The identification of Heracles in the enigmatical struggle with the marine monster appears more than probable from the combat of that hero, which is represented upon the most interesting relief found during the past year (Plate 15). The scene illustrated is that episode from the legend of the Doric hero, which, not figuring as one of his greater labors, is usually connected with his expedition in pursuit of the Erymanthian boar.¹ On that journey Heracles came to the cave of the centaur Pholos, who offered friendly hospitality, — placing roast meat before his guest, while he himself was contented with raw. With this meal the hero required wine ; and as Pholos, the son of Silenos, had received a jar directly from Dionysos, with instructions that it should be kept until the advent of Heracles, this was forthwith opened. The mountain-roaming centaurs of the neighborhood, who in Greek legends always appear untamably maddened by wine, perceived the broaching of the attractive liquor from its odor, and rushed upon Heracles, armed with clubs and stones. The hero drove away, with firebrands, those who came nearest, and continued the contest in the forest with his bow. The struggle was rendered difficult by Nephele (the cloud), the mother of the centaurs, who poured down torrents of rain, so that Heracles could hardly stand upright upon the slippery earth, while his four-legged opponents were not thereby discomforted. The bravest of the centaurs were at last killed, and the rest pursued to Cape Malea.

This identification of the relief is supported by the analogy

¹ The story of Heracles and Pholos is told at length by Apollodorus, Diodorus, and Tzetzes. It is mentioned by many other ancient writers.

of similar representations upon vases.¹ It is interesting to note that this same scene was one of the subjects of the reliefs upon the throne of Amyclae,² and apparently one of those also upon the chest of Kypselos at Olympia,³—these two most celebrated examples of ancient decorative sculpture thus giving evidence of the extent and popularity of the legend of Heracles and Pholos at an early period of Greek artistic activity.

The appearance of the bowman Heracles without lion's-skin and club is not uncommon in archaic representations. Upon our relief the stooping position of the carefully running archer may perhaps be referred to the slippery ground, which plays so important a part in the legend. The front foot of Heracles is flat upon the ground, which is not the case with either of the centaurs.

The fragmentary figure at the extreme left of the composition probably represents Iolaos, the relative and constant companion of Heracles. Iolaos is indeed not mentioned by ancient writers as taking an independent part in the hunt of the Erymanthian boar or the combat with the centaurs; but in all ages of Greek story he appears so inseparably connected with Heracles that the proverb *πρὸς δύο οὐδ' ὁ Ἡρακλῆς*⁴ suggested the support of Iolaos, who was even directly venerated as his *παραστάτης*.⁵ Upon five of the seventeen known antique illustrations of this centauro-machia, Iolaos appears at

¹ The representations of Heracles in the cave of Pholos and in combat with the centaurs have been collected in the *Compte Rendu de la Commission Impériale d'Archéologie de St. Pétersbourg*, 1873, by Stephani, in a most learned paper entitled *Erklärung einiger Vasengemälde der kaiserlichen Ermitage*. The most interesting of the seventeen examples which illustrate the combat outside the cave is a sarcophagus in Rome, published in *Mon. pubbl. dall' Inst. Arch.* 1855, pl. 19; fourteen are vase paintings.

² Pausanias, iii. 18.

³ Pausanias, v. 19.

⁴ Plato, *Phaedon*, 89: "Heracles is not a match for two."

⁵ Plutarch on *Brotherly Love*.

the side of Heracles, — this being notably the case upon the sarcophagus in Rome, referred to in a preceding note.

The legend of the hospitable reception in the cave of the centaur particularly relates that Pholos and Heracles were drinking the tempting wine from great cups¹ when interrupted; and as an indication of the original cause of the combat Iolaos holds in one hand a drinking-vessel, raising the other as in encouragement. The appearance of this figure seems almost a reminiscence of the ever-present followers of the victorious Assyrian monarchs upon Oriental reliefs.

Judging from the width of the inter-columniations, and the position of the middle regula, this epistyle block is, upon the upper surface, preserved in its entire length. Were it not for this, and for the fact that the sculptured representations were limited to the fields of the separate lintel blocks, it might be more natural to assume that the fragmentary figure was that of the centaur Pholos, — to whom the attribute of the drinking-vessel would more directly appertain. But it is hardly possible that the body of a horse could have found room upon the left of the epistyle relief. The appearance of ~~two~~ upright human figures is certainly better in artistic effect than if Heracles had been wedged in between the greater bulk of centaurs upon either side, without reference to a symmetrical composition of the opponents.

Heracles bends his bow against three centaurs, who hasten away with brutish gestures of fear, throwing their arms wildly into the air and running so closely together that each oversteps the hind legs of the one before him. The foremost bears upon his shoulder a rude club, similar to those observable

¹ Mr. Sidney Colvin, in his excellent paper on "Representations of Centaurs in Greek Vase Painting," *Journal of Hellenic Studies*, 1880, remarks that the earliest literary allusion to the story, a fragment of Stesichoros, in Athenaeus (xi. c. 99), describes the huge cup, handed to Heracles by Pholos, as σκύφειον . . . δέπας ἕμιτρον ὡς τριλάγνον.

upon the reliefs of three centaurs in Paris ; the one nearest the hero seems to hold a stone in his uplifted right hand, — these being the weapons with which, according to the legend, the centaurs carried on the combat.

The great peculiarity of these centaurs is that they are represented in that highly archaic combination of man and beast, in which an entire and perfect human being is joined to the body of a horse. It is this form of a centaur which is described by Pausanias in his account of the chest of Kypselos, which has been before referred to. The appearance of centaurs with human fore-legs is sufficiently common, especially in the case of Chiron, upon early painted vases and engraved gems. But the only examples in which it has hitherto been observed in sculptures are two small archaic bronzes, — a figurine found by Ross near the Parthenon, and a relief recently unearthed at Olympia.¹ So fine an example of its occurrence in monumental stone-carving as the present relief is wholly unparalleled.

All the centaurs upon the blocks of the epistyle and upon one of the metopes, taken from Assos to Paris, show the improved form of the beast, with the four legs of a horse. This remarkable occurrence of both species upon the same building is probably due to the execution of the reliefs by different sculptors, whose artistic conceptions were as various as the degree of technical ability displayed in their work.² The

¹ *Archæologische Aufsätze* von Ludwig Ross. Erste Sammlung. Leipzig, 1855, Taf. vi. The author speaks of the little figure as "half a span long," and refers to similar discoveries in Etruscan graves. See *Mon. ined.* ii. plate 29. A wood-cut of the figurine from Athens is given by Perry in his *Greek and Roman Sculpture*. London, 1882, p. 102. Compare also *Archæologische Zeitung*, 1881, Drittes Heft, where O. Puchstein illustrates, plate xii., a vase from Cyrene, on which are represented in the same scene centaurs of both kinds.

² *Die Ausgrabungen zu Olympia. Band iii. Übersicht der Arbeiten und Funde, vom Winter und Frühjahr, 1877, 1878. Herausgegeben, von E. Curtius,*



PLATE 16.

Fragment of Temple Relief. Assos
discovered Oct. 4th 1891.

decorations of the temple of Assos were evidently not under a masterly superintendence, like that which assured so perfect unity to the sculptures of the Parthenon.

The figure of Heracles (Plate 15) is so similar in certain anatomical peculiarities to the hero represented as struggling with the sea-monster, upon the most important relief in Paris, that the blocks may reasonably be assumed as the work of one hand.

Of all the sculptures of Assos discovered by the present expedition and in the Louvre, the magnificent sphinxes (Plate 16) are by far the best preserved, they alone having been taken from a hard bed of mortar, which had long saved them from weathering. The carving of this relief is of a delicacy and vigor comparable to the best works of fully developed Greek art. Throughout the body the firm muscles and yielding cushions of flesh are indicated with an appreciation of natural forms which shows a distinct advance beyond the art of Mesopotamia, successful as were its representations of animals, while the decorative character of the composition is maintained by the admirable outline of paws, wings, and tail. The heads are of that archaic type familiar in Attic sculptures dating near the beginning of the fifth century B. C. The eye, though shown nearly in profile, is still too large; the corners of the mouth drawn up to a meaningless smile.

The Egyptian derivation of the sphinx is more evident than is elsewhere the case upon Greek works, by the closely fitting head-dress, welted upon the forehead and falling stiffly behind the ears. The origin of the sphinx, which appears so often in the early legends and art¹ of Hellenic lands, is a vexed

F. Adler, und G. Treu. Berlin, 1879. See also Curtius, *Das archaische Bronze-relief aus Olympia*. Berlin, 1880.

¹ The appearance of decorative sphinxes may be seen in the following publications: Inghirami, *Vasi fittili*, pl. 279, 308; Micali, *Storia*, pl. 4, 7, 11, 16, 17, 28, 29; *Mus. Borb.* vol. xiii. pl. 57; *Mon. pub. dall' Inst. Arch.*, vol. ii. pl. 18, and many others.

question upon which the sculptures of Assos may throw important light. Following the most thorough writer upon the subject, Jaep,¹ the belief has hitherto been common that the sphinx was an independent creation of the Greek myth; still the Egypto-Phœnician character of the settlement of Bœotian Thebes by Cadmus, and the first appearance of the monster at that place, seems too plain an indication to be easily explained away. The present relief certainly disproves the assumption of Voss² that the Greek sphinx, like the Egyptian, originally had no wings, — not receiving them until the age of the great Attic dramatists, — which theory had already been made extremely improbable by Gerhard.³ But the influence of Mesopotamia is known to have had a most direct bearing upon the artistic conceptions and methods of the Asiatic Greeks, and winged combinations of human heads and animal bodies are common in the decorative sculpture of Assyria.

The dimensions of this relief, the architectural symmetry of the composition, and the existence of a similar relief for the rear of the temple, prove it to have decorated the lintel above the central inter-columniation of the front. The couching griffin, or sphinx, appears from the reverse of all the earlier coins of Assos to have been the emblem of the city. The representation of these animals above the entrance and upon both fronts of the chief fane of Assos, in exactly the same conventional attitude as upon the coins, and in a duplication which is the fundamental principle of the coat-of-arms, makes the assumption of its heraldic significance more than probable. Curtius⁴

¹ *Die griechische Sphinx, eine Mythologische Abhandlung.* Von Dr. G. Jaep. Göttingen, 1854.

² Voss, *Mythologische Briefe*, vol. ii.

³ In the *Abhandlungen der königl. Akademie der Wissenschaften zu Berlin.* 1839.

⁴ *Ueber Wappengebrauch und Wappenstil im griechischen Alterthum*, von E. Curtius. *Abhandlungen der königl. Akademie der Wissenschaften zu Berlin*, 1874. Among the illustrations of this interesting paper there are several



PLATE 17. LION AND BOAR

has pointed to the emblematic character of the two crows of Crannon, the winged sow of Clazomenae, the double head of Tenedos, the goat of Elyros, and other types. The two axes carved above the portals of Mylasa appear also upon the coins of that town. The most striking example of such a civic coat-of-arms is presented by the well-known relief above the Gate of the Lions at Mycenæ, — the most ancient monumental sculpture of Europe, — the design of which is comparable in every respect to the sphinxes carved upon the temple of Assos. The heraldic animals at Mycenæ, like those at Assos, are separated by an upright shaft, by which firm division a certain decorative character is obtained, not held to be sufficiently evident from the symmetrical repetition of the lions and sphinxes, and the conventionalized treatment of their attitudes and bodily forms. The erect position of the lions was determined by the triangular tympanon for which they were composed, even as the long, low extent of the sphinxes resulted from the proportion of the epistyle block : in principle the two reliefs are entirely similar. It is above gates and entrances that such figures are particularly in place, as the custom of the Middle Ages bears witness. The employment of emblems was general and varied in Greek antiquity. Of all the animals chosen, with the exception perhaps of the constantly occurring lion, none was better adapted for a municipal symbol than the sphinx, — a mysterious creature of supernatural force, wisdom, and ever-blooming youth.

The relief of the lion and boar (Plate 17), when compared with the Heracles, shows the far greater ability to deal with animals than with human forms, which is peculiar to the sculptures of Mesopotamia, and to that early artistic activity of the Asiatic coasts which stood in close relationship to it. It

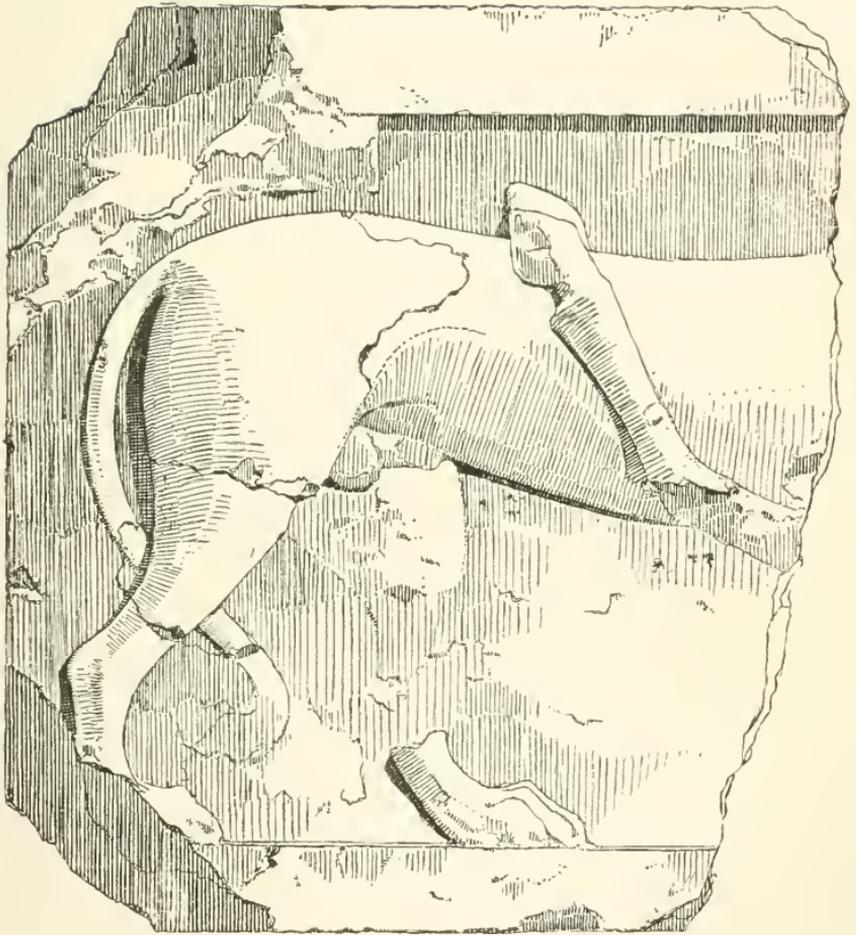
examples of this duplication of animal types to form the coat-of-arms of a city, as in the coins of Marion, Delphi, Argos, and of some town in Lycia.

is of course not supposed that these two reliefs were the work of one hand; the marked superiority of the hunting-scenes is evident throughout all the sculptures of the temple, and does not need to be argued from any single example. While the human figures of Plate 15, of the metopes Plates 21 and 22, and of the Heracles and banqueters in the Louvre, are so helplessly designed and executed as to compare most unfavorably with the nearly contemporary gable groups of Ægina, — the sphinx (Plate 16), the boar (Plate 17), and above all the hindquarters of the lion (Plate 18) are, on the other hand, works of admirable art.

The legs and tail of the boar (Plate 17) are characterized with great truth. Though seized by the lion, the animal has not lifted his head from rooting, the attack in the rear not seeming to cause him much disturbance. The hind-legs are set to withstand the push of the burrowing snout; the tail hangs limply upon the broad flank, as if in indication of hoggish enjoyment. Along the back runs a fin of bristles, terminating sharply between the ears. It is unfortunate that the head and fore-legs have been much injured; in some measure the details of this part of the body may be determined by a comparison with the lank boar of the Louvre metope, although that relief is, throughout, in a state of preservation hardly superior to the most battered parts of the present block.

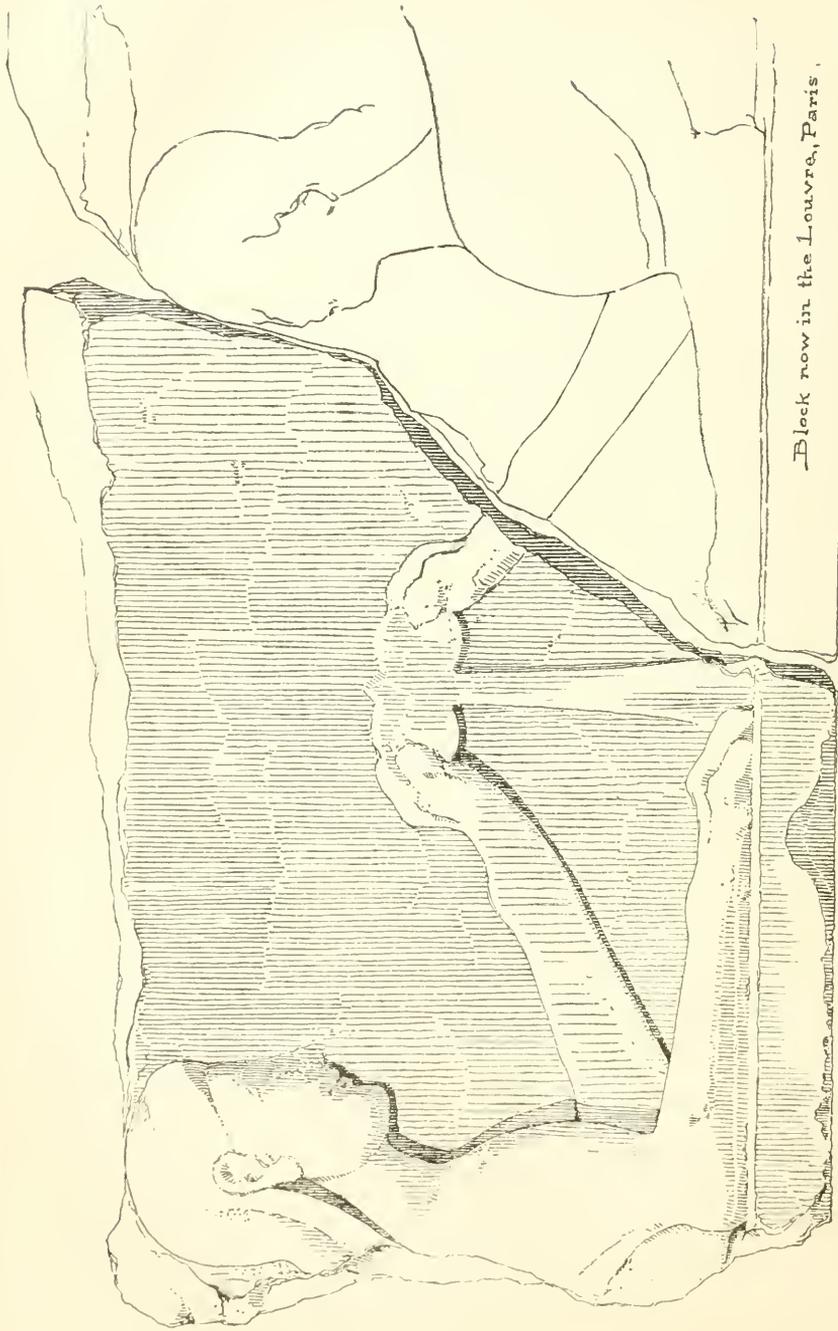
Though thus familiar with the appearance and action of wild boars, which have always abounded in the neighborhood of Assos,¹ it is evident, from certain errors of form, that the sculptor had never seen a lion. The latter animal is less well carved in detail, while an Oriental stiffness

¹ Enormous boars from the Mysian mountains devastated the land during antiquity. See Herodotus, i. 36. The animals are numerous to-day, especially upon the heights of Ida; the villagers, whose fields are uprooted by the beasts, are glad to beat the bush for hunters armed with effective weapons.



B. del.

PLATE 18. HIND-QUARTERS OF LION.



Block now in the Louvre, Paris.

Fragment of Temple Relief : Assos.
discovered Sept 19th 1881

makes his action appear listless and unconcerned. The head is turned upon the side in such a manner as to show it directly from above; the ears being almost equidistant from the outline of the neck. The long tail hangs nearly straight, the extremity being so turned as to make the tassel stand upright. Throughout this relief the sculptor has displayed a certain humor, which makes up for the ungraceful carving and the ignorance of leonine peculiarities.

The magnificent figure of a lion (Plate 18) is of an entirely different character, and is evidently the work of another hand. The beauty of outline, force, and delicacy of the muscles; the action of the limbs and swing of the tail, — in short, every detail of this block displays a fine mastery of animal form and action. In point of technical execution, the sculpture of this relief is hardly inferior to the masterpieces of the Theseion and Erechtheion.

It is particularly to be regretted that the situation of the block, after the overthrow of the temple, exposed it to the action of standing water and frosts; the surface is not corroded, but the raised parts of the stone have, in several places, been split from the background. The upper part of the left leg and the end of the tail have thus been entirely lost, while the flank is in fragments. The lion bears upon his back the legs of a deer.

The extent to which the individual characterization of the various animals was indicated in the details is evident from a comparison of the tails of the heraldic sphinxes, the boar, and this lion.

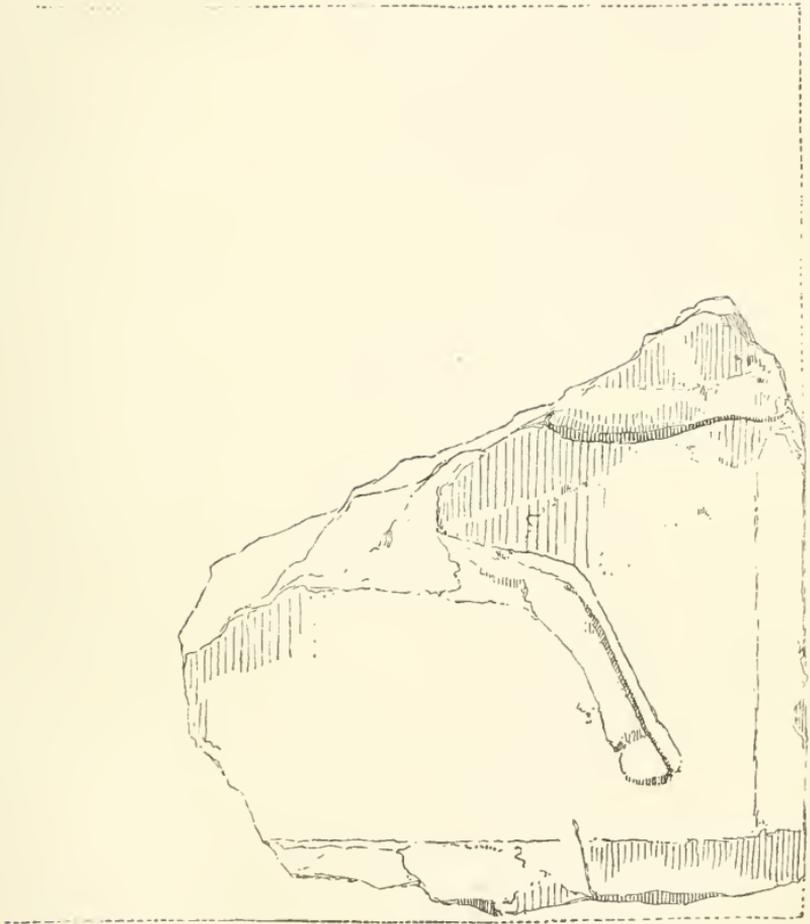
The fragment of a sphinx (Plate 19), discovered upon the surface, has already been spoken of as possibly having been seen by Texier. It fits accurately upon the epistyle relief of a sphinx now in the Louvre. In workmanship it is greatly inferior to the corresponding carving of the eastern front, and, like all

the sculptures which were not covered with earth, it is badly weathered. The disproportionately long fore-legs resulted from the distance left between the breasts of the animals, and determined a low angle for the uplifted paw against the central support, which, with the gap between the opposite heads, was fatal to the decorative character of the composition. The different termination of the separating shaft is no improvement upon that of the eastern front.

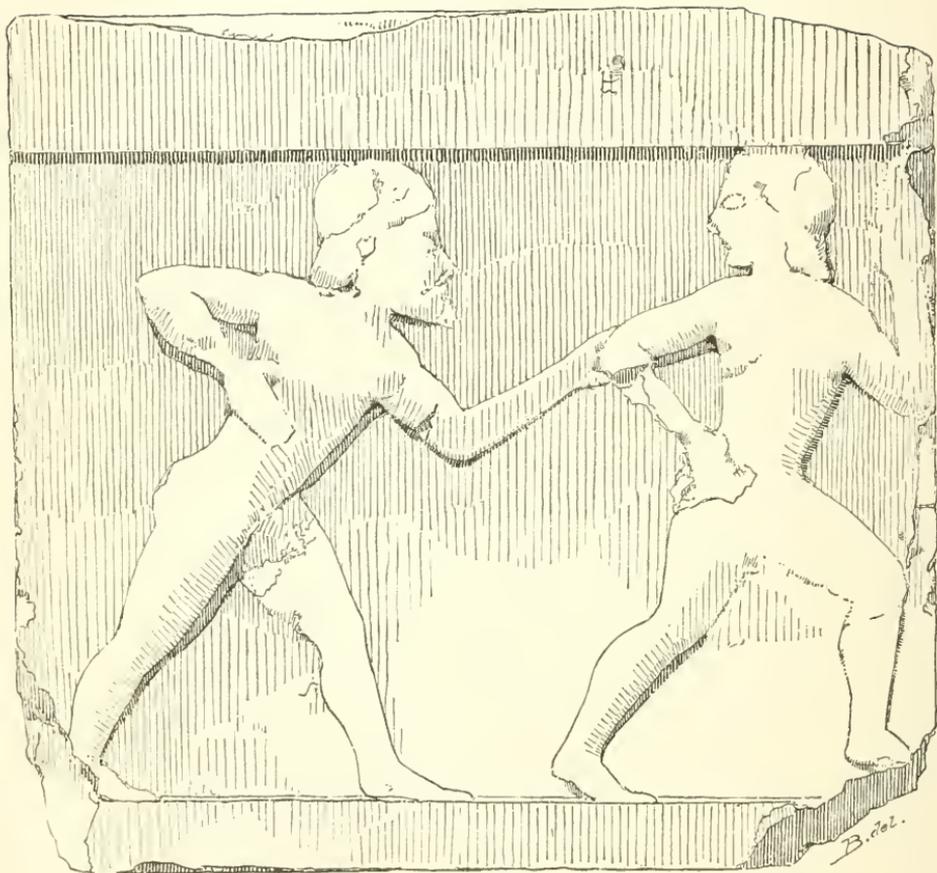
The fragment of an epistyle relief (Plate 20) is of interest, as showing the occurrence of centaurs with horses' fore-legs side by side with the more archaic form referred to above. Upon the right of this block, as upon Plate 15, a narrow fillet is noticeable, the purpose of which was to separate the sculptures upon adjoining lintels, — often designed upon a different scale, and of a different character.

From these fillets, as well as from the triple epistyle construction, it is evident that the reliefs were carved upon the ground during the erection of the building and before the placing of the lintels. This was without doubt also the case with the metopes, which were slid in behind the projecting edges of the triglyphs. This accounts for the independent and disconnected appearance of reliefs set in juxtaposition after their execution, as well as for the number of different hands employed upon the stone-cutting. The sculptors were limited to a much shorter time than if the decorations had been carved after the completion of the edifice.

In the restoration of the temple front (Plate 14) the two longest reliefs in Paris occupy the corners, to which they are assigned on account of the exceptionally large spaces between their regulas. The position of the recumbent sphinxes, above the central inter-columniation, has been determined with greater certainty. The relief illustrating the combat of Heracles and the centaurs thus appears to have been above the second inter-



FRAGMENT OF EPISTYLE, ASSOS.
Discovered Aug. 8, 1881.



Temple Metope .Assos
Discovered Aug. 15th 1881.

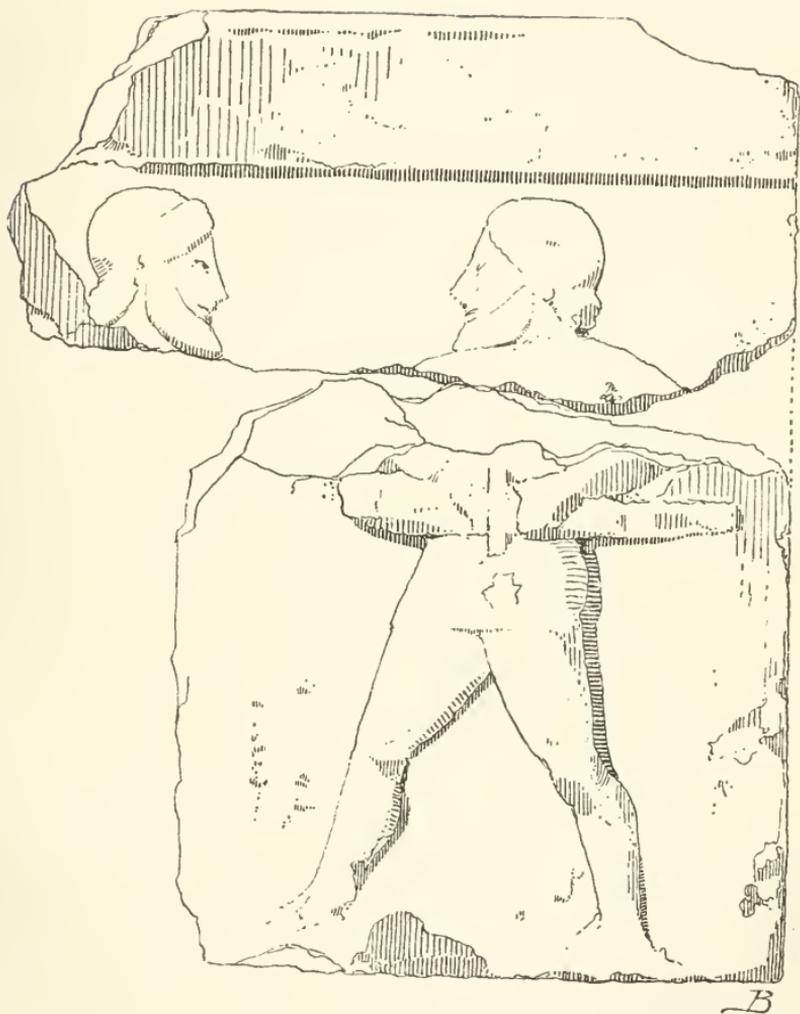


PLATE 22.

columniation, and has consequently been placed there. As no other block known to have belonged to this front has been found, this last scene has been reversed to fill out the epistyle.

During the excavations a number of plain metopes were met with, and as only five sculptured metopes are known, — three being in Paris, and two having been found by the present Expedition, — it is probable that those upon the sides of the temple were not ornamented with carvings.

The one complete metope relief (Plate 21) represents a man pursuing a woman, — a time-honored subject, difficult to individualize, which may, perhaps, from the analogy of the other sculptures, be referred to the myth of Heracles. The female figure is crowded helplessly into the side of the field; her arm must have touched the edge of the triglyph, which projected, from constructive reasons already considered, about 0.015 metre over the metope.

It is possible that the decoration was thrown thus out of centre, by a diminution on one side of the width of the slab, after the carving. The stones, sculptured in the workshops, probably did not always fit exactly into the interstices left between the triglyphs. In the planning of a frieze of many blocks, the allowance for the joints is usually under-calculated, especially in so coarse a material.

The fragmentary metope (Plate 22) shows two warriors in combat, — the one of which the body has been preserved drawing a short sword from a sheath held in his left hand. His loins are girded with a cloth, — this being the only indication of drapery upon any of the reliefs, with the exception of that of the female figures upon the relief in Paris, the struggle of the hero and sea-monster.

The primitive clumsiness of these metopes, when compared with the representations of the lion (Plate 18) and the sphinxes (Plate 16), instructively illustrates the very different degrees of

ability and artistic advance displayed by the stone-cutters employed contemporaneously upon the decoration of the building. This excellence of the best of them is a weighty argument that the construction of the temple does not date from an epoch more remote than the termination of the Persian war.

The archaic character of the reliefs is due to local provincialism, as well as to the antiquity of the work: in determining the proportion in which these two influences are to be estimated by the historian of art, the appearance of so great an individual variation gives great weight to the former. With the sculptures, as with the architecture, it is evident that the most advanced characteristics must be held as the true indication of the age of the monument, rather than the traits that exhibit primitive conceptions and technical inability. The high perfection exhibited by Plates 16 and 18 by no means points to a greater antiquity than, for instance, that of the sculptures from the gables of the temple of Ægina, with which the semi-barbarous decorations of Assos may be supposed to be contemporary. The sculptures of the temple of Ægina, like its architectural peculiarities, record an independent advance beyond the most immediately preceding works. Such an advance is not to be expected on the northern coast of Asia Minor during this historical period, and could not have been instantaneously shared by a land so recently freed from the long occupation of Oriental barbarians.

The metopes from the temple of Assos, here presented, are certainly far more inferior to the sphinxes, lions, and boar of the epistyle than are these latter to sculptures of European Hellas, referred to the third decade of the fifth century B. C.; and yet the greatest variation possible in contemporary sculpture cannot be assumed to be displayed in these decorative reliefs.

Though previous writers have been able to judge of the date of the sculptures of Assos only from the blocks in the Louvre, without knowledge of the architectural arguments derived from the plan and elevation of the temple now given for the first time, it is proper to call attention to the fact, that, with the exception of Clarac, the most eminent authorities on the history of Greek art by no means share the views here advanced, but assign to these works a considerably greater age. Dr. Brunn, whose unequalled knowledge of the style and artistic relations of antique sculptures gives his opinion the greatest weight, has not found the discoveries here published to alter his former belief, that the construction of the temple of Assos was previous to the sixty-fourth olympiad, B. C. 524. Mr. Sidney Colvin, in the essay before mentioned, remarks that it is impossible to date the reliefs later than the sixth century. Of the older writers, Friedrichs even attempts to prove, from the absence of the lion's skin as an attribute of Heracles, that the sculptures were carved before the end of the seventh century B. C. ; while Overbeck, on the other hand, thinks it doubtful if they are older than the sixtieth olympiad, B. C. 540.

The temple reliefs of Assos may be considered as the most important link in the chain connecting the carvings of the early civilizations of the East and the unequalled sculptures of Greece. It is only by defining the position of such works that the application of the historic method to the study of intellectual and artistic growth can be of value. Archaeological investigations can in no wise give a more direct and practical assistance to the architecture and sculpture of to-day than by indicating the path followed by the early Greek artists in their progress toward supreme excellence.

The Oriental and transitional character of the reliefs, evident from the pre-eminence of the animal forms, is even more apparent in the reminiscences of the empaistic work of Phœ-

nia, that great mediating power between the sculpture of Mesopotamia and the primitive attempts of Hellenic art. The Homeric epics constantly point to the Syrian coast as the home of skill in sculpture and metal work ; and it is not surprising that the Greeks of Asia Minor, being immediately exposed to this influence, should retain traces of the art of the hammer even as late as the end of the Persian occupation.

The proceeding of the Phœnician artisan was to make a model of wood for the relief, or sculpture in the full round, as the case might be, upon which sheets of metal were secured, and finally beaten to the shape of the carving beneath. This method of work was long practised, and, its products being exported in all directions, was of the most widespread influence. It is natural that the peculiar forms resulting from the technical properties of beaten sheet-metal should determine a style which is recognizable even in stone carvings, when these were the creations of sculptors familiar with works of this kind. All the prehistoric monuments of Greece bear traces of this influence ; and it appears in the archaic and provincial reliefs of Assos, recent as these are when compared with the treasures and tholos of Mycenæ. It is most noticeable in those sculptures which are least developed in artistic respects ; the sphinxes and the hindquarters of a lion betraying no traces of it, while the characteristic metallic forms are strikingly evident in the struggle with the sea-monster, the banquet, in the metopes found during the past year, and in the lion's head from the corner gutter.

The figures upon these last reliefs offer, in general form as well as in detail, analogies to the primitive vase paintings of Phœnicia.¹ This empaistic character of the sculptures of

¹ Compare Raoul Rochette, in the *Journal des Savans*, Avril, 1835; De Witte, *Catalogue Durand*, Introduction, and other passages relative to the question; Ch. Lenormant, *Cours d'Histoire Ancienne: Introduction à l'Histoire de l'Asie Occidentale*, etc.

Assos explains the striking similarity noticeable between them and the most ancient bronze works of Etruria, — especially the important reliefs from a chariot found at Perugia now preserved in the Glyptothek of Munich, and the figures from Cervetri, published by Grifi.

Not only the detailed forms of the decoration of the temple of Assos, but its position upon the building, point to the prototype of a work of hammered metal, and in this respect it appears of direct importance to the history of the early architecture as well as the sculpture of the Greeks. The reliefs upon the epistyle, the principal constructive member of the entablature, warrant the conjecture that the timbering of ancient Asiatic fanes was overlaid with sheets of metal, as is known to have been frequently the case with the columns and walls.¹

The wooden roof and ceiling of the original Hellenic cella appear in the temple of Assos already translated to the unvarying stone forms of the Doric frieze and cornice, with the exception alone of the trunnels, which seem not to have been regarded as of canonical importance. The great peculiarity of the entablature, — namely the decoration of the epistyle, a functional lintel never sculptured in the perfected Greek styles, — appears to be a provincial imitation of the empaistic overlaying customary in the architecture of neighboring lands.

The importance of so remarkable a monument to the early history of Hellenic art is evident.

It is not the purpose of this first Report to treat in detail of the city walls of Assos or the monuments of the lower town. Much, indeed, has been ascertained to which no reference can be at present made ; for even were the full pub-

¹ A reference to this empaistic character of the reliefs of Assos is made by Semper in *Der Stil*, etc. Zweite Auflage. München, 1876. Bd. i. p. 406.

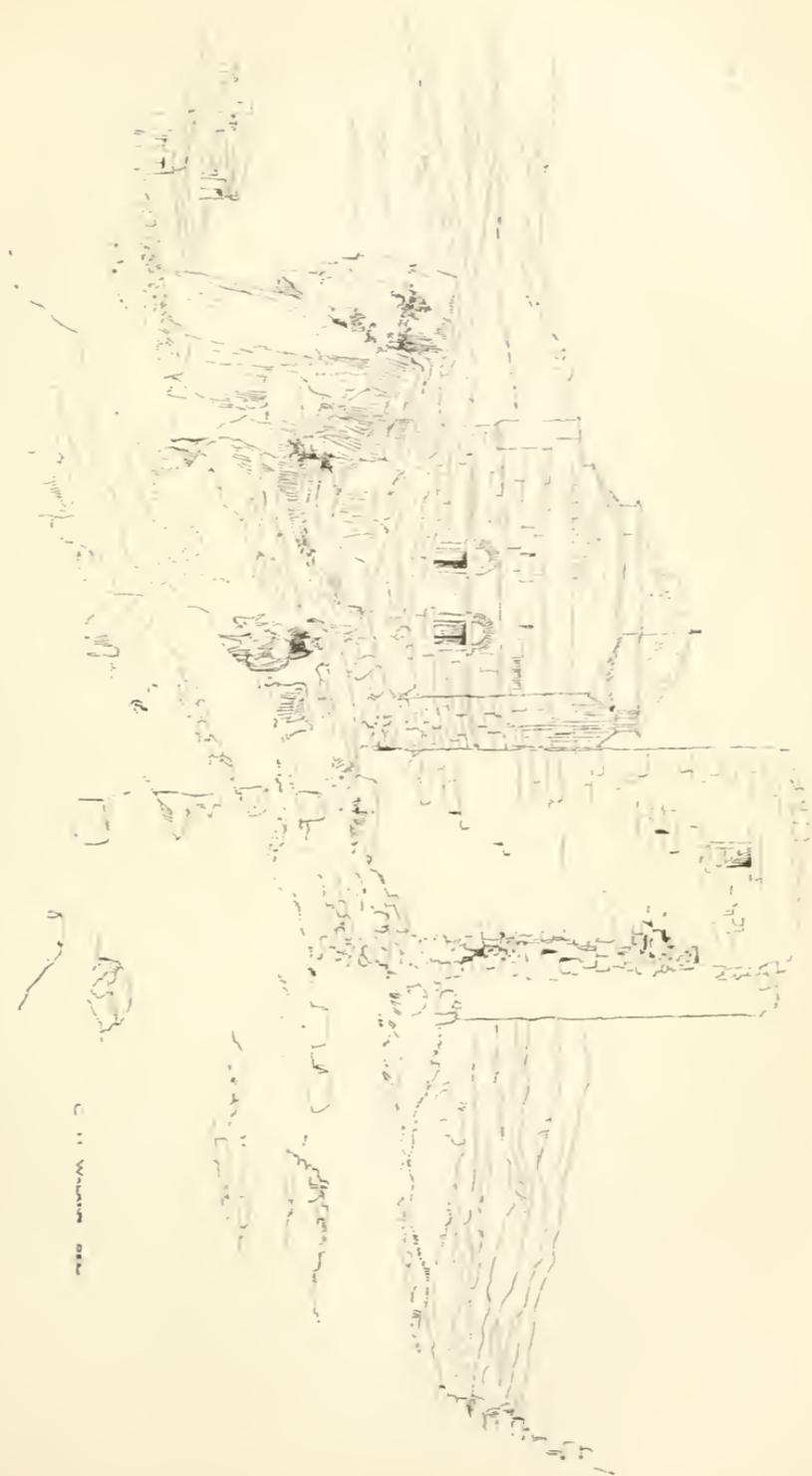
lication of the partial results already obtained considered desirable, there does not now remain time for the comparative studies to which it would lead. The season is approaching when the trenches are freed from the frosts of winter, and the active work of the second season is at once to be begun. Still, in order to indicate the scope of the investigations, a number of illustrations are given which require a brief explanation.

In descending from the upper step of the Acropolis, remains of Hellenic fortifications are met at the northeastern extremity of the lower level. The enclosures at this point rise to a height of one metre above the present surface of the ground, being of a heavy masonry of equal courses, apparently of about the same character and date as the extensive city walls.

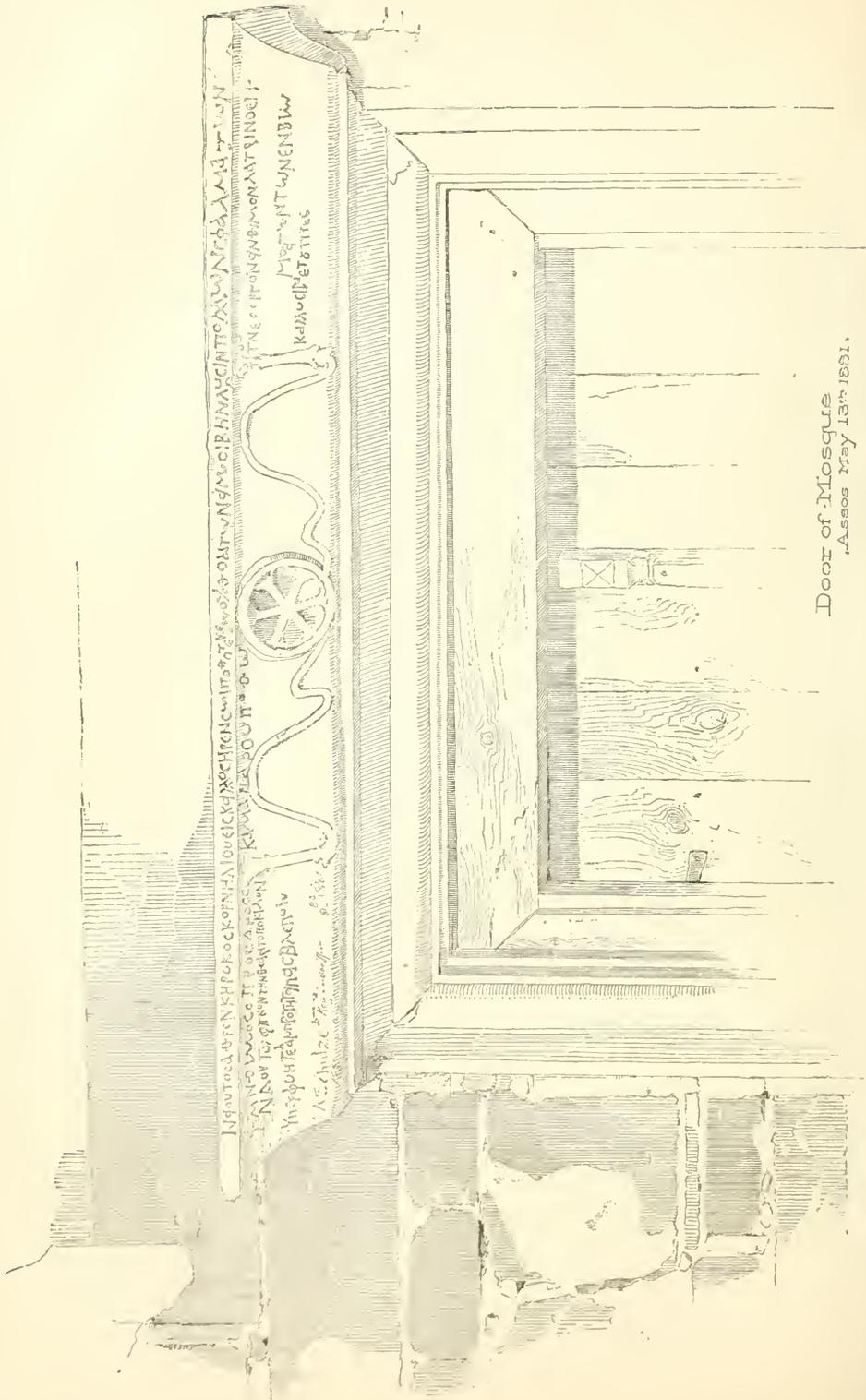
These ramparts must have been overthrown at a comparatively early age, for they appear as the foundations of a square tower of good mediæval masonry (Plate 23), which has been filled by the kitchen débris and ashes of successive occupants to a height of not less than eight metres above its floor. The door of this structure seems to have opened upon the platform of the ramparts which enclosed the lower Acropolis; and as this wall has been demolished, there is now no accessible entrance. The corner of the tower has been broken into by the Turks, at which point the stratified débris is exposed.

The Byzantine church, now serving as a mosque, is separated from the tower by a narrow passage, and, as may be seen from the plan (Plate 2), stood outside the fortifications. This is the building — “un ancien temple de forme élégante, moitié carré, moitié conique” — which appeared so remarkable to Poujoulat, who maintained that “la religion musulmane nous a ainsi conservé dans son intégrité première un monument appartenant aux beaux âges de la Grèce.”

PLATE 23. MOSQUE, AND MEDIEVAL TOWER.



C. 11. W. 11. 11. 11.



Door of Mosque
Assos May 13th 1891.

Such an amusing conception is not necessary to make the church of interest to the investigator ; its importance as being built of stones from the wall and ceiling of the Doric temple has already been indicated. The site of the building has been planed from the top of a prominent cliff, the columns of the vestibule standing directly upon the native rock. The greater part of the edifice is Byzantine, its age being perhaps determined by the inscription upon the lintel of the door (Plate 24). The vaulting of the dome, which appears upon the exterior as an octagon, may be that of the original construction, although the pendentives are Turkish stalactites, dating from an extensive restoration, which greatly altered the external appearance. The narthex must have been almost entirely rebuilt at this time, its graceful arches being of the pointed form peculiar to early Ottoman architecture. The building is situated so directly above the village that the minaret which the Turks elsewhere added to Christian churches was not necessary. The bare interior was at first zealously guarded from the visits of giaours, but during the second season there will probably be no difficulty in making the necessary measurements for detailed plans and sections.

The publication of the monuments which appear in the topographical sketch (Plate 3) is wholly reserved for the next Report. Before the stoa plateau, directly above the theatre, there extended a second edifice, provided like the upper colonnade with reservoirs. No excavations whatever have been made in the deep earth at this point, and the general arrangement of the complex of buildings must be accurately determined before any consideration of details can be of value. The elaborate descriptions of the theatre given by Hunt and Prokesch-von-Osten, taken in connection with the points determined by the trial pits sunk here during the first season, establish the arrangement of auditory and scene, at least in

plan ; but the connection of the theatre with the terraces above it is uncertain, and all these structures of the central town, which seem to date from a contemporary rebuilding, are too closely related to admit of their being separately described.

The excavations at the gymnasium have not led to results which could as yet justify a thorough consideration of this edifice (Plate. 4), which, in its frequent antique restorations and involved original disposition, presents many unsolved problems. A detail of the extensive mosaic discovered in the basilica hall is given in Plate 25. Formed of various-colored marble cubes, of careful workmanship and interesting design, this pavement must have covered a space not less than three hundred square metres. The border, of which every division presents a different pattern, has remained intact in the greater part of its length exposed by the trenches, the centre having unfortunately been almost entirely broken away. Remains of another mosaic were found in the enclosure, and it is hoped that the continued examination of this site may lead to interesting discoveries.

It has already been stated that one of the chief tasks of the second season will be the thorough study of the fortifications of Assos. The importance of these unrivalled monuments of Greek military engineering is so great that were their publication to be the only result of the Expedition, the undertaking would be amply repaid. Not only are the planning and construction of the ramparts, towers, portals, and posterns of interest in each case, but traces of successive enclosures, dating from different ages, illustrate the growth of the city in extent and power, giving information such as is afforded by no other remains of antiquity.

The most recent Hellenic fortifications, which alone have been known from the *Description de l'Asie Mineure*, notwith-

- I. Light Ochre.
- II. Madder Red.
- III. Indigo Blue.
- IV. White.
- V. Orange

Centre Pattern broken away

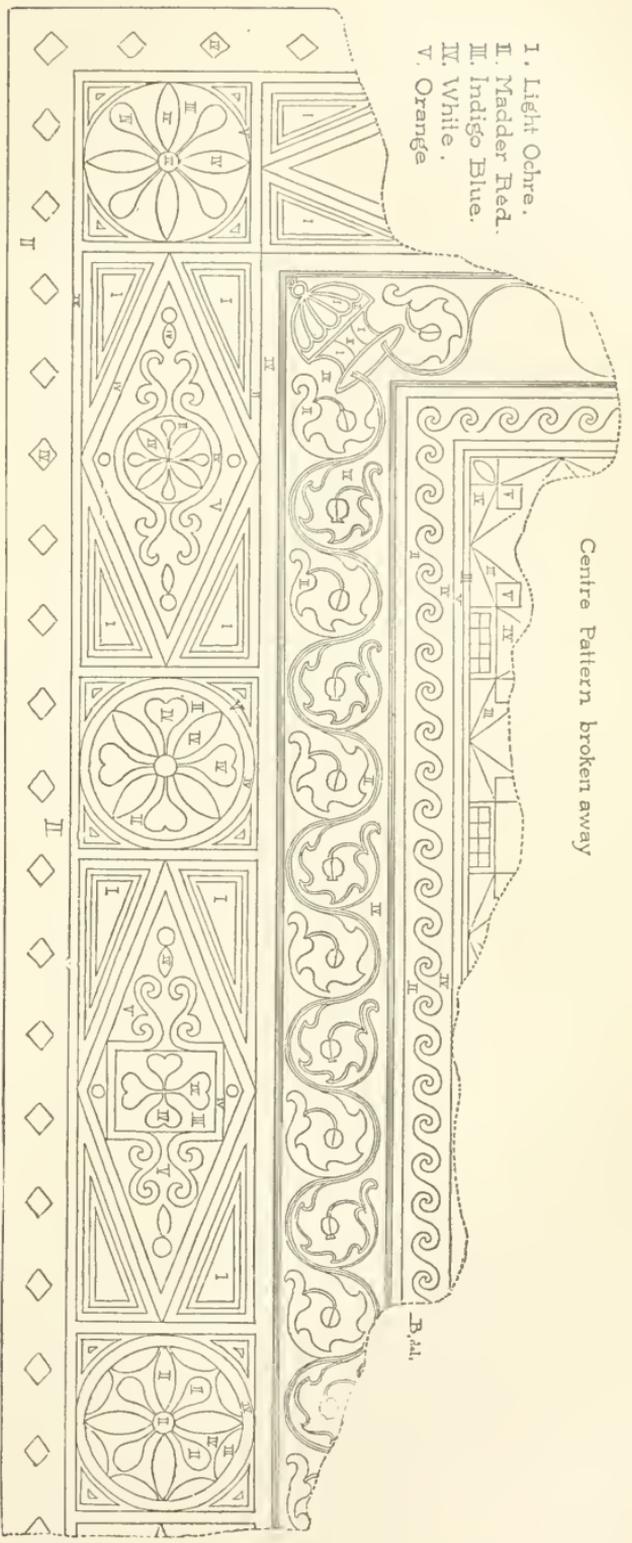
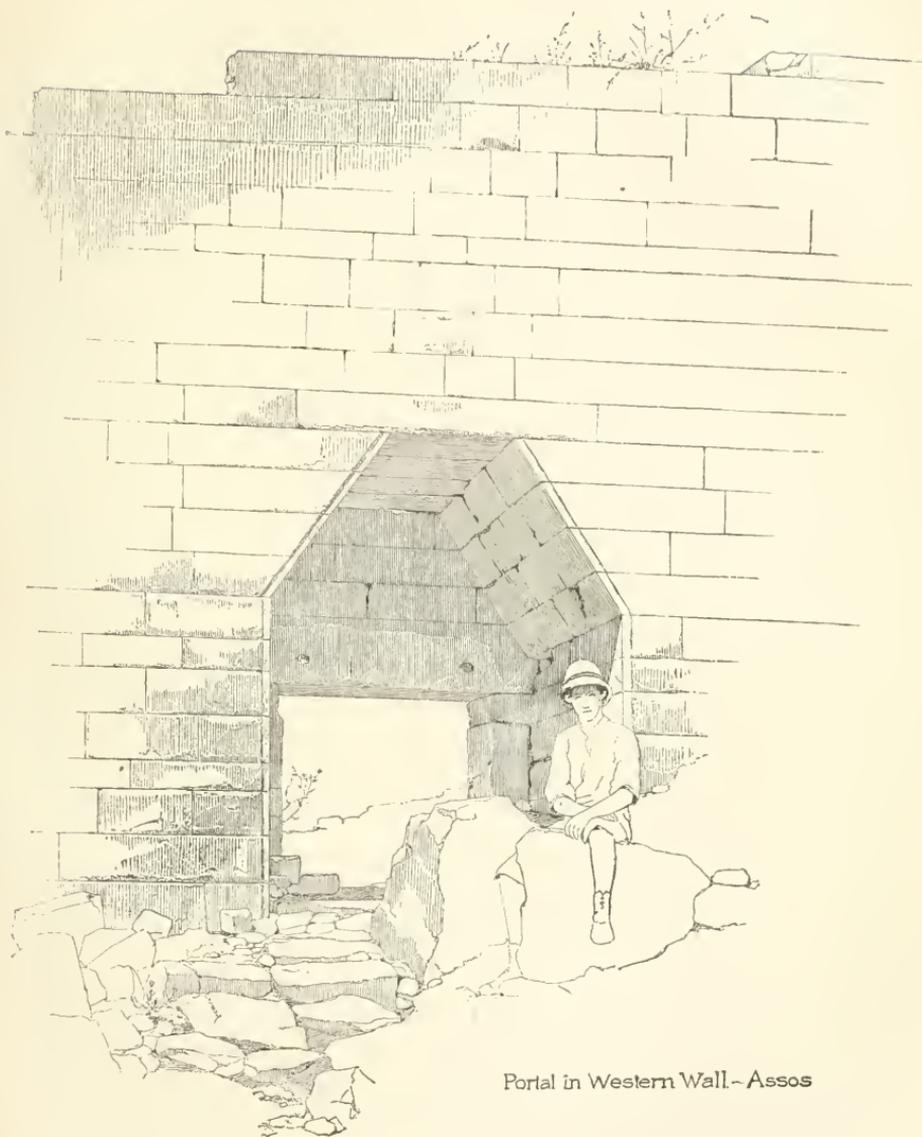


PLATE 25. MOSAIC PAVEMENT, FROM GYMNASIUM.



Wall of Polygonal Masonry
Built up in later Greek wall.
Assos.
May 18th 1881



Portal in Western Wall - Assos

Assos June 1st 1881
Ernest Innes

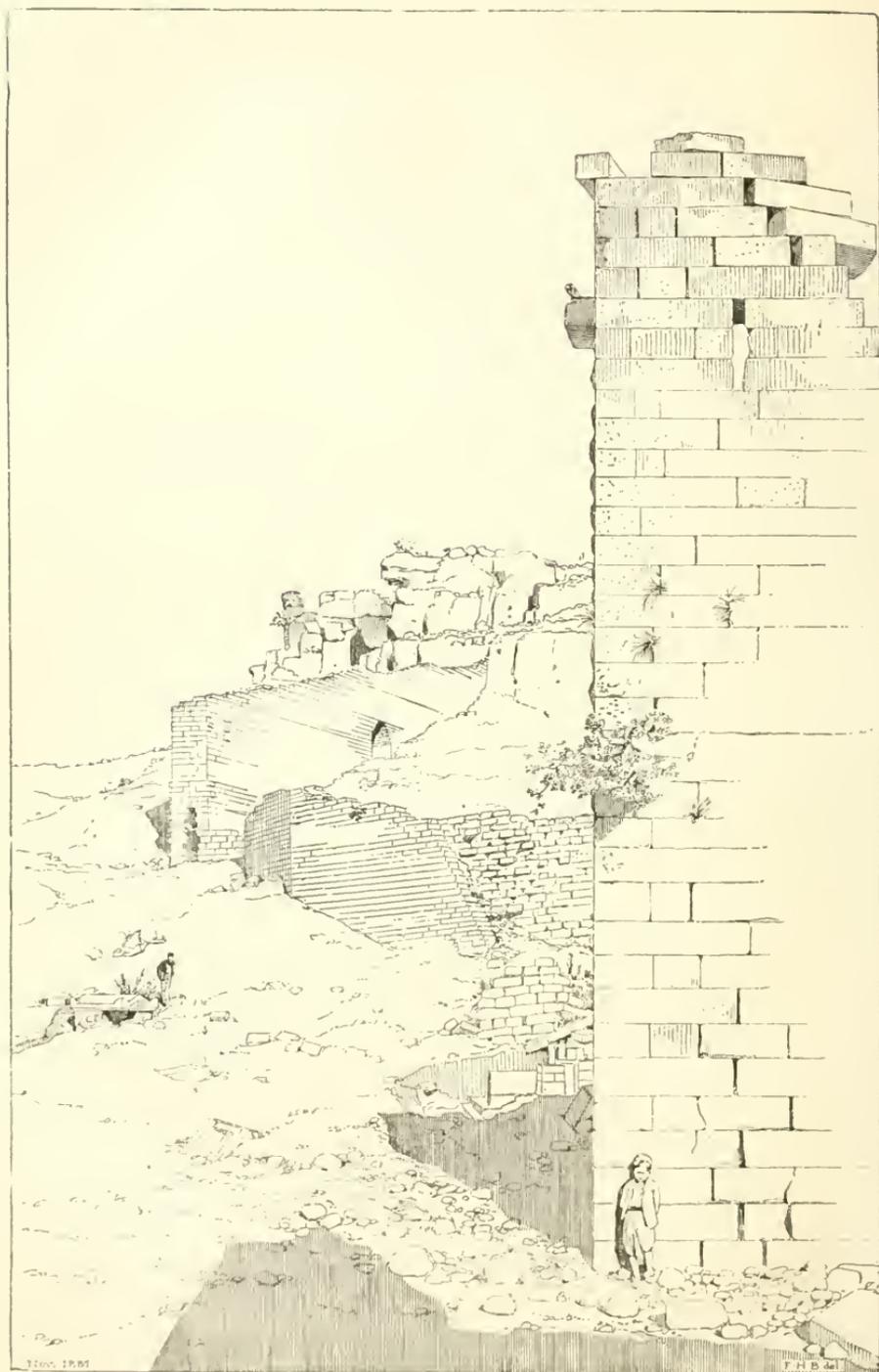


PLATE 28. TOWER AT NORTHWEST GATEWAY.

standing the lamentable injury lately done to them by the Turks, are still in a wonderfully perfect state of preservation. The remark of Texier appears hardly an exaggeration; in places the walls "seem rather a commenced and unfinished work than a ruin." Throughout their entire extent, — a length of over three kilometres, — these fortifications are built with unvarying care, being skilfully so planned as especially to protect the points by nature most exposed to the attack of a besieging enemy. The greater part of the circuit can be traced; it is only at the north of the Acropolis, near the precipitous descent from the village to the river valley that the position of the wall is uncertain.

The rectangular blocks, exactly jointed, are laid without mortar in horizontal courses of equal height, bonded from face to face by headers. This regular masonry is at times built upon and on the face of the polygonal walls of an older period, as is shown by Plate 26, which represents a breach at the extreme west. The principle of the vault is employed in one of the towers, but not in any of the gate-openings where circular and pointed blind-arches are cut from the horizontal courses, — as at Ephesus, Thoricos, Messene, etc., — or where the edges of the projecting stones form an oblique transition to a comparatively short lintel, as in the portal, Plate 27. This opening, marked *A* upon the topographical plan (Plate 1) is in the transverse division wall, which runs from the Acropolis cliff to a re-entering angle of the outer fortifications. The northern and southern enclosures of the city were connected only by this narrow passage, in the jambs of which the bolt and pivot holes of the heavy doors are visible.

The chief gateway of the northwest upon the ancient road leading to Lecton and Alexandria Troas is flanked by enormous towers, one of which is shown in Plate 28. The view is taken towards the Acropolis, the northwestern corner of which, show-

ing the height of the lower step, appears in the distance. From the cliff descends the before-mentioned transverse wall with the portal, Plate 27.

Outside of the fortifications are seen the vestiges of the sarcophagi and sepulchres which bordered the street of Tombs. The plan of this extensive cemetery appears on a small scale upon the map of the city ; its section, looking to the north, is given by Plate 29. All the antique structures upon this sketch-restoration have not been determined by the limited excavations undertaken at the site, but the general arrangement of the terraces is accurately indicated.

The funeral monuments were placed upon the edges of three levels, which, rising above the principal road, extended to the foot of the city enclosure. The broad passages left free from sarcophagi must have served as a promenade and place of assemblage for the inhabitants of the crowded town ; this

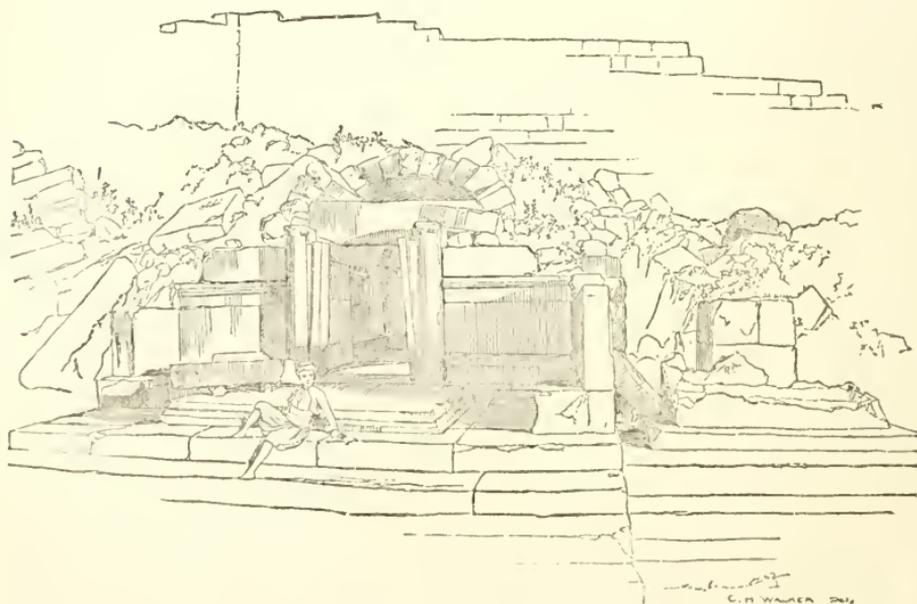


PLATE 31.

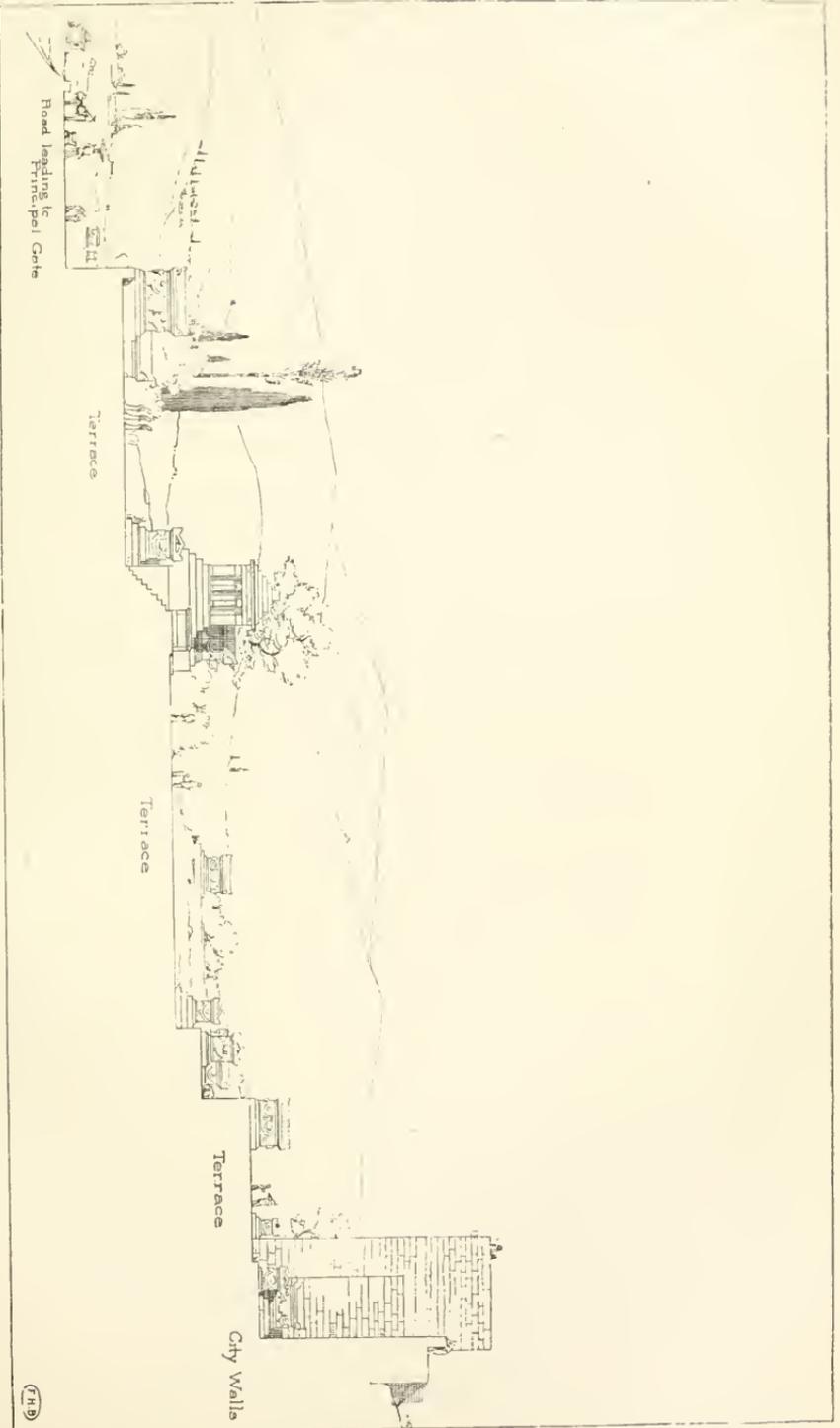


PLATE 20. SECTION OF CEMETERY, RESTORED.

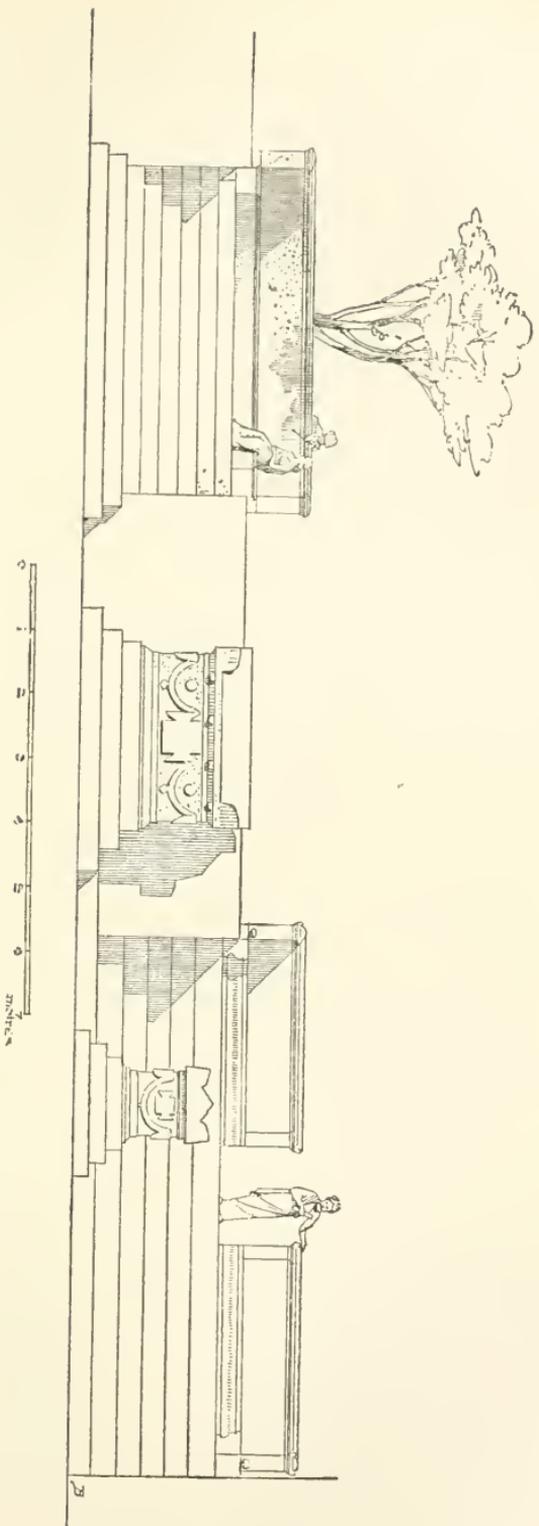


PLATE 30. EXEDRAS IN CEMETERY.

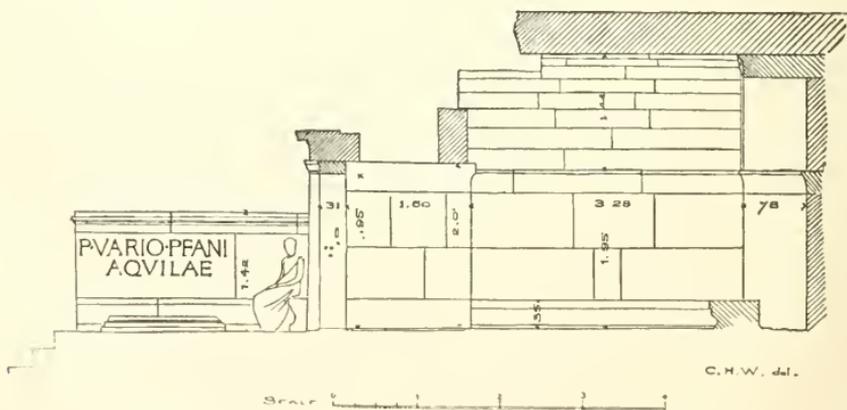
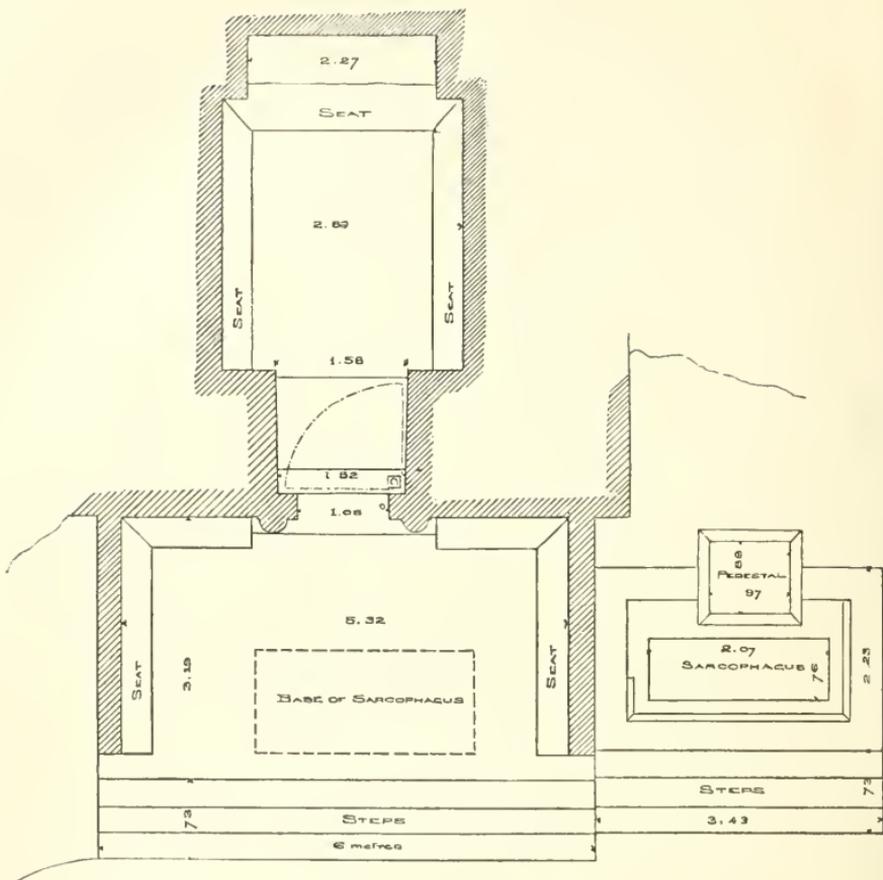


PLATE 32. PLAN AND SECTION OF RECEIVING TOMB.

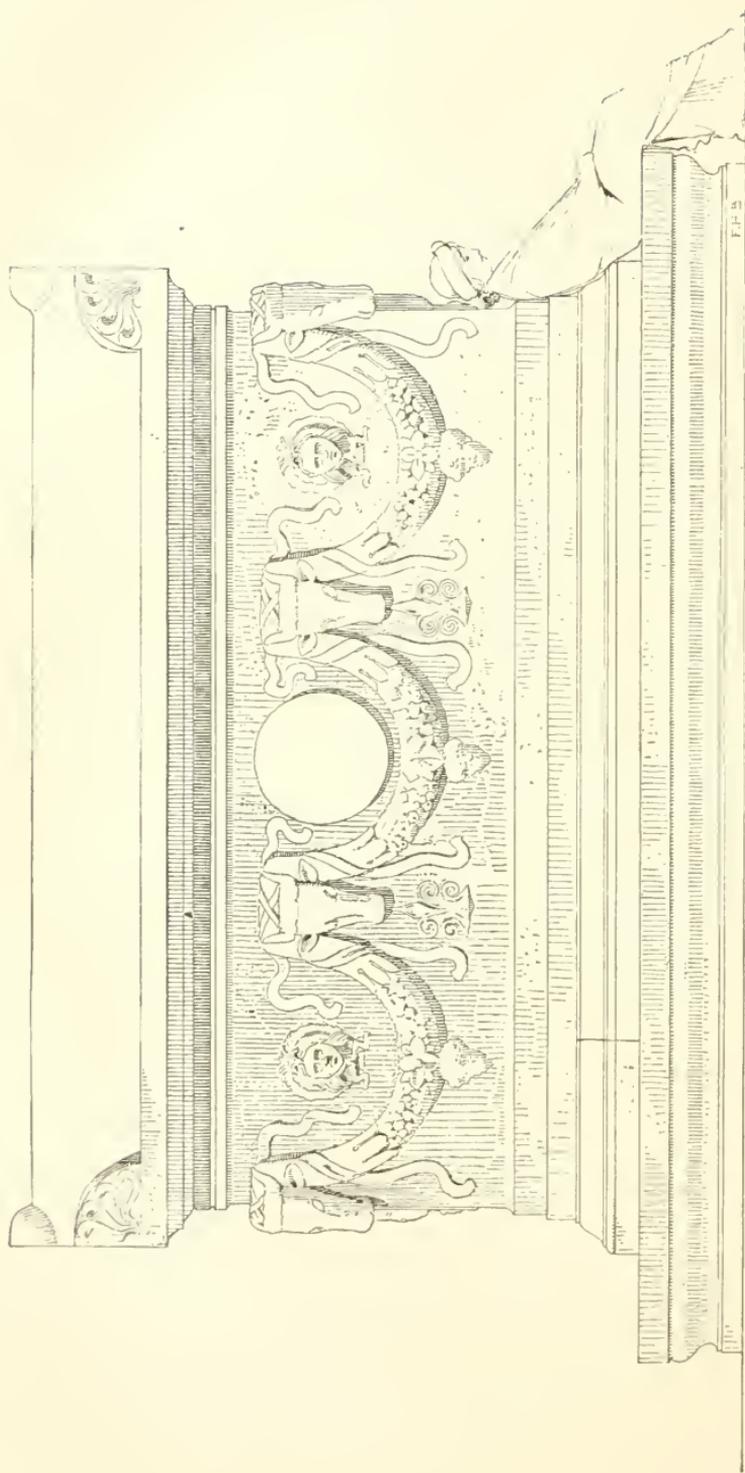


PLATE 34. SARCOPHAGUS, RESTORED.

destination being shown by the attractive arrangement of broad steps and public seats from which the magnificent sunset panorama of the river plain and far-stretching gulf could be enjoyed. Two such exedras, the one of semi-circular, the other of rectangular plan, are presented in elevation by Plate 30.

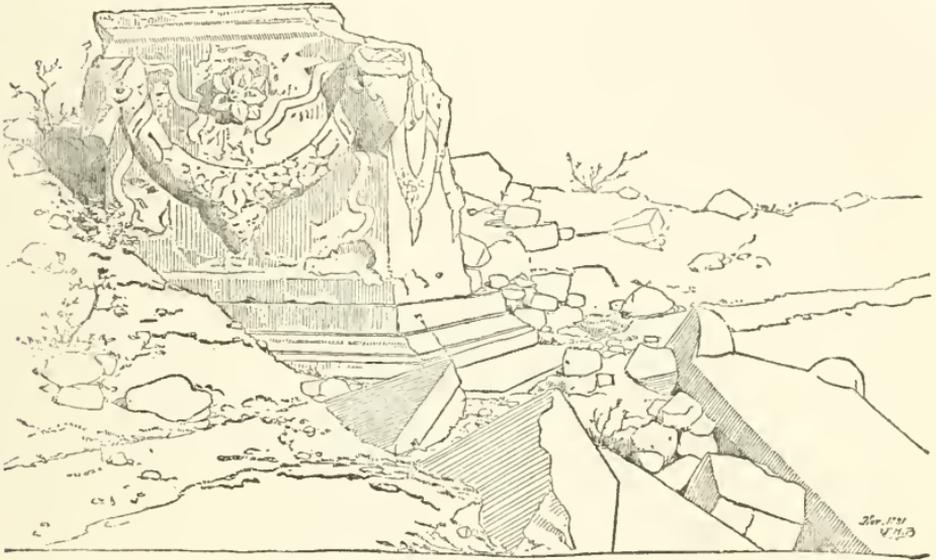


PLATE 33.

The tombs are of every variety of form and disposition, from vaulted receiving sepulchres, like that shown in Plates 31 and 32, to free-standing sarcophagi, — one of the most interesting, but by no means one of the best preserved, of which is illustrated in its present condition and original appearance by Plates 33 and 34. The carving upon this latter chest, although badly weathered, is so characteristic in design, that if its shattered sides are discovered during the future investigations, it will well repay transportation, notwithstanding its great weight.

Farther from the gates of the city are mounds of débris, which mark the situation of extensive monuments, so hopelessly overthrown that an understanding of their construction

was not possible without excavations, for which the first year allowed no time.

One branch of the road which passes the street of Tombs continues directly to the north, crossing the Satnioeis at a point indicated upon the map of the city, Plate 1. Here were discovered considerable remains, which afford the only known example of an ancient Greek bridge, Plate 35. The structure is certainly the only existing instance of a work of this kind in which the principle of the lintel, so tenaciously adhered to previous to the age of the Diadochi, has been consistently carried out. The fact that the Greeks seldom attempted the execution of monumental works of engineering, such as were so often undertaken by the Romans, made wooden bridges much more common than those of stone, even in such important positions as the passage between Aulis and Chalkis, where a bridge connected the island of Euboea with the mainland. Of these timbered constructions there remains, of course, not a vestige. All the stone bridges occurring in Greek lands are of vaulted form,¹ and must be referred to the late epoch of the Roman occupation, as in the instances of the triple passage over the river Pamisos, between Andania, Megalopolis, and Messene, and the single arch over the Eurotas, near Sparta. The projecting horizontal courses of the foundations on the road between Pylos and Methone may be of considerable age; but, as in every known example, the upper portion of this structure, built with wedged-shaped stones, dates from a mediæval restoration.

At Assos, on the other hand, the ruins show the bridge to have maintained its original form unchanged as long as it was

¹ Gell, *Itinerary of Greece, etc.*, London, 1810, mentions two examples of small constructions above rills with a horizontal termination, at Phlios, and near Mycenæ, on the road to Nauplia; but the former appears to have been a mere opening in the fortifications of the town, and the latter is a formless mass of small stones, the age of which is extremely doubtful. Neither can be spoken of as a proper bridge.

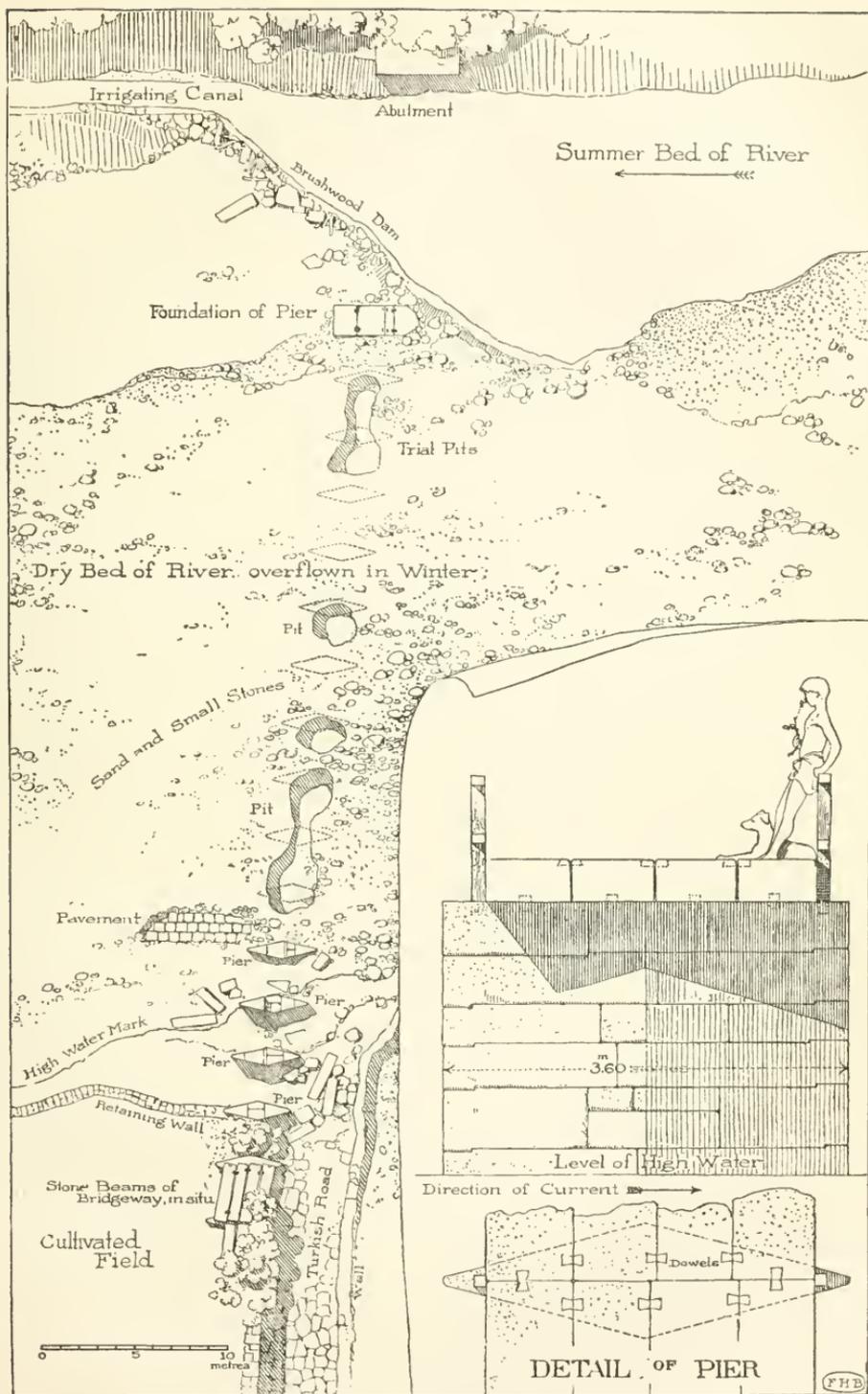


PLATE 35 BRIDGE ON THE SATNIOEIS.

in use. Upon the southern bank of the stream, above the high-water mark, the stone beams of the platform are still in position. The piers are in plan of elongated diamond-shape, and extend upon either side slightly beyond the bridgeway to a length of 3.6 metres. The masonry of these supports consists of large blocks, carefully jointed, and is particularly remarkable for the system of combing by which the action of the current is resisted. The detail of pier is given on Plate 35. The joggles cut twice upon each course made it impossible to displace any stone by lateral pressure without entirely overthrowing the heavy pier, which presented a minimum width to the stream.

Upon these admirable foundations was laid a platform of stone lintels, in length about three metres from centre to centre of the piers. Four beams were placed side by side to provide a passage amply broad for the needs of ancient traffic. Wagons can never have been extensively employed in the rugged Troad. The lintels were bonded together by swallow-tailed dowels of wood, in the manner universal in the Hellenic architecture of the fourth century B. C. Seventeen piers, thus connected, are known to have extended from the southern bank to the present summer bed of the river, where the last traces were examined. Upon the northern bank are the remains of a heavy abutment. The midsummer work of the second season will determine whether the piers and horizontal stone beams were continued across the deeper water, or a lighter-timbered structure spanned the thirteen and a half metres remaining between the abutment and the last foundation which could be observed after the October rains.

It is certain that the course of the stream has not changed at this point, which was by the nature of its banks particularly well adapted for the site of a bridge. Only a short distance above, the sandy reach, overflowed by the stream, is several

hundred metres broad; while below, in the Halesion Plain, the arches of a Roman bridge are so far from the present bed that the water cannot be seen from the ruins.¹

A peculiarity of the Assos bridge is that it did not cross the river at right angles, but followed the general direction of the road. The axes of the piers were, however, parallel to the current; and hence the lintels were in plan placed obliquely upon their foundations.

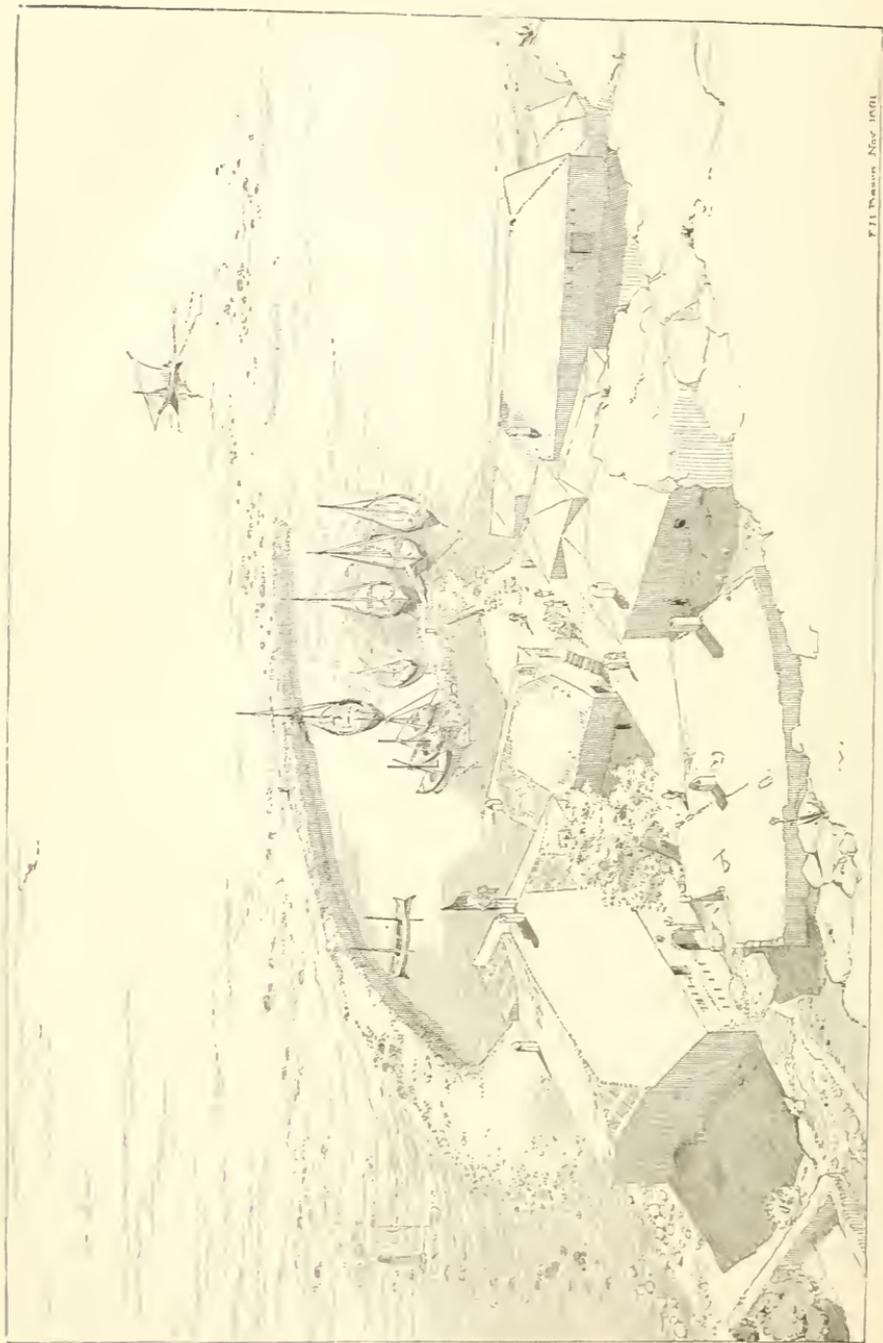
The winter bed of the stream, near the bridge, appears to have been entirely paved in antiquity, probably as an approach to the summer bed, where the water is still drawn for the use of the village of Behràm during the driest months, as already described. The greatest disadvantage of the site of Assos must always have been its lack of fountains; and the reservoirs and cisterns built for the collection and distribution of the rain-fall are of an importance not elsewhere accorded to them by the Greeks.

In crossing the plateau again, the road, after passing the southern limits of the city fortifications, descends so abruptly to the port that the houses are seen almost directly from above. The climb from the sea to the city enclosure is the steepest and stoniest conceivable; the break-neck position of Assos was notorious even in antiquity among a people who found nothing remarkable in the elevation of the Acrocorinthos or the Acropolis of Segesta. Stratonicos, an Athenian musician and poet, noted for his witty and sarcastic remarks, a number of which are preserved by Athenæus, applied to it the line of the sixth book of the Iliad, —

"Ασσον ἴθι, ὡς κεῖ θᾶσσον ὀλέθρου πείραθ' ἵκηαι, —

playing upon the adverb. Surprisingly little has been done to ease the natural difficulty of the ascent. Here and there are fragments of ancient paving-slabs and polygonal retaining-

¹ Compare the mention of the altered position of the Touzla at this point in Mr. Diller's geological appendix.



F. J. Pearson. New York 1861.

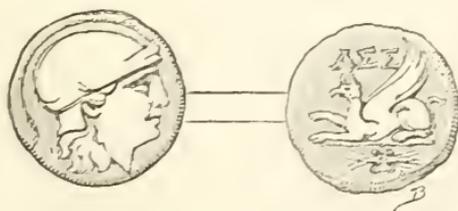
PLATE 36. PORT AND TURKISH MOLE.

walls ; but so much has been washed away from the declivity that for the greater part of the way one is obliged to scramble up the side of the natural rock. If the trodden path be deserted, the climb has to be performed with hands as well as feet. Beasts of burden take an easier, round-about way, indicated on the map of the city.

The mighty blocks of the ancient mole are shown by Plate 36, as seen beneath the clear water. Results of interest are hoped from the further examination of this extensive work of engineering, as well as from the similar remains at the east. Both these dykes seem to have sunk bodily, as by an earthquake, to a depth averaging about two metres below the surface of the water. The preservation of the masonry is in places excellent, and on calm days the posts cut upon the coping, to which the ancient vessels were moored, can be distinctly recognized.

The Turkish mole, piled up of small stones and gravel, shelters but about one-fifth of the original enclosure. The little open boat at the extreme left is the *Myzethra*, by which all the communication of the Expedition with the outer world has been maintained. The large magazine on which the flag is hoisted is our home ; in two rooms of its upper story are the simple household effects, the surveying and measuring instruments, the many books and drawings, with which in the present year the work at Assos is to be carried on. May it result in fortunate discoveries, as well as in the thorough investigation of ruins already known, but not yet properly studied.

JOSEPH THACHER CLARKE.



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ΟΡΚΟΣ ΑΣΣΙΩΝ

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ΤΡΕΣΕΥΤΑΙΕΤΗΝΓΕΙΑΝΤΟΕΚΤΟΝΗΚΙΩΝ

ΓΑΤΟΣΟΥΑΡΙΟΣΓΑΙΟΥΣΥΓΕΛΟΥΝΙΑΚΑΣΤΕ
ΕΡΜΟΨΑΝΗΣ
ΚΙΤΗΤΟΣ
ΑΙΣΧΡΩΝ
ΠΕΡΜΙΑΣΤΟΣ
ΦΙΝΟΜΟΥΣ

ΟΙΤΙΝΕΣΚΑΙΥΠΕΡΤΗΣΓΑΙΟΥΚΑΙΣΑΡΟΣΕΡΑΣΤΟΥΤΕΡΜΑΥ
ΙΣΤΗΡΙΑΣΕΥΣΑΜΕΝΟΙΣΙΚΑΠΠΙΩΝΑΙΘΕΩΣΑΝΤΩΤΩΣΕΡΩΝΕ
ΑΛΛΟΝΟΙΥΑΤΙ

THESE ARE THE OATHS OF THE ASSIANS

APPENDIX.

I.

INSCRIPTIONS FOUND AT ASSOS IN 1881.

I.

THIS inscription, engraved on a bronze plate (0.54 × 0.38 m.), of which a facsimile is given in the plate opposite (Plate I.), contains a decree of the town of Assos, passed on the accession of the Emperor Caligula in 37 A. D.

Ἐπὶ ὑπάτων Γναίου Ἀκερρωνίου Πρόκλου καὶ
Γαίου Ποντίου Πετρωνίου Νιγρίνου.

Ψήφισμα Ἀσσίων γνώμη τοῦ δήμου.

Ἐπεὶ ἡ κατ' εὐχὴν πᾶσιν ἀνθρώποις ἐλπισθεῖσα Γαίου
Καίσαρος Γερμανικοῦ Σεβαστοῦ ἡγεμονία κατήγγελλται,
οὐδὲν δὲ μέτρον χαρᾶς εὐρηκ[ε]ν ὁ κόσμος, πᾶσα δὲ πόλις
καὶ πᾶν ἔθνος ἐπὶ τὴν τοῦ θεοῦ ὄψιν ἔσπευκεν, ὡς ἂν τοῦ
5 ἡδίστου ἀνθρώποις αἰῶν[ος] νῦν ἐνεστῶτος,

*Ἐδοξεν τῇ βουλῇ καὶ τοῖς πραγματευομένοις παρ' ἡμῖν
Ῥωμαίοις καὶ τῷ δήμῳ τῷ Ἀσσίῳ κατασταθῆναι πρεσ-
βείαν ἐκ τῶν πρώτων καὶ ἀρίστων Ῥωμαίων τε καὶ Ἑλλή-
νων τὴν ἐντευξομένην καὶ συνησθησομένην αὐτῷ
10 δεηθησομένην τε ἔχειν διὰ μνήμης καὶ κηδεμονίας
τὴν πόλιν, καθὼς καὶ αὐτὸς μετὰ τοῦ πατρὸς Γερμανικοῦ
ἐπιβὰς πρώτως τῇ ἐπαρχείᾳ τῆς ἡμετέρας πόλεως
ὑπέσχετο.

Ὅρκος Ἀσσίων.

Ὅμνυμεν Δία σωτήρα καὶ θεὸν Καίσαρα Σεβαστὸν καὶ τὴν
 15 πάτριον ἀγνὴν παρθένον εἰνοήσειν Γαίῳ Καίσαρι Σεβασ-
 τῷ καὶ τῷ σύμπαντι οἴκῳ αὐτοῦ, καὶ φίλους τε κρίνειν
 οὓς ἂν αὐτὸς προαιρῆται καὶ ἐχθροὺς οὓς ἂν αὐτὸς προβά[λ-]
 ληται. Εὐορκοῦσιν μὲν ἡμῖν εὖ εἶη, ἐφιορκοῦσιν δὲ τὰ ἑναν-
 [τία].

Πρεσβευταὶ ἐπηγγείλαντο ἐκ τῶν ιδίων.

Γαῖος Οὐάριος Γαίου υἱὸς, Οὐολτινία, Κάστος,
 20 Ἐρμοφάνης Ζωίλου,
 Κτήτος Πισιστράτου,
 Λισχρίων Καλλιφάνους,
 Ἄρτεμίδωρος Φιλομούσου,
 οἷτινες καὶ ὑπὲρ τῆς Γαίου Καίσαρος Σεβαστοῦ Γερμανικοῦ
 25 σωτηρίας εὐξάμενοι Διὶ Καπιτωλίῳ ἔθυσαν τῷ τῆς πόλε-
 ως ὀνόματι.

IN THE CONSULSHIP OF GNAEUS ACERRONIUS PROCLUS
 AND GAIUS PONTIUS PETRONIUS NIGRINUS.

A Decree of the Assians by Vote of the People.

SINCE the supremacy of Gaius Caesar Germanicus Augustus, for which all men have hoped and prayed, has been proclaimed, and the world has known no bounds to its delight, and every city and every nation is eager to behold the face of the God as the greatest delight which the present age can offer to mankind, —

Be it enacted by the Senate, and the Roman merchants established among us, and the People of Assos, that an embassy be appointed from the first and best Romans and Greeks to meet and congratulate him, and to entreat him that he will hold our city in remembrance and under his

protection, even as he himself promised when with his father Germanicus he first entered upon the government of our city.

Oath of the Assians.

We swear by the Saviour Zeus and Deity Caesar Augustus, and by the pure Virgin whom our fathers worshipped, that we will be faithful to Gaius Caesar Augustus and all his house; and that we will consider those our friends whom he shall prefer, and those our enemies whom he shall declare. May it be well with us if we are true to our oaths, and may it be otherwise if we are false to them.

These offered themselves as ambassadors at their own expense :—

GAIUS VARIUS CASTUS, son of Gaius, of the tribe Voltinia.
 HERMOPHANES, son of Zoilus,
 CTETUS, son of Pistratus,
 AESCHRION, son of Calliphanes,
 ARTEMIDORUS, son of Philomusus,

who also invoked Jupiter Capitolinus for the safety of Gaius Caesar Augustus Germanicus and made sacrifice in the name of the city.

II.

This inscription, copied by Mr. W. C. Lawton, was found on two fragments of stone, September 5 and 6, 1881, in Assos, at the eastern end of the Stoa plateau, in a narrow passage which ran close to the edge of the parapet and was probably the chief outlet thence to the lower town. It contains a decree, passed by some town whose name is lost, giving a crown and a vote of thanks to the town of Assos for sending judges or referees to decide certain lawsuits, and giving the same distinctions to the judges themselves. The upper part of the inscription, with most of the preamble, is lost. Inscription No. 3568 *f*, in Boeckh, *Corpus Inscript. Graec.* vol. ii. p. 1128, contains a similar vote of thanks sent by the town of Peltae to Antandros : Boeckh assigns this document to the third century before Christ. No facsimile of the present inscription, giving forms of the letters by which its date could be determined, has been received.

. ΜΙΑ

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 5 ΠΑΡΧΟΣΑΝΕΤΧΑΡΙΣΤΙΑΝΔΕΔΟΧΘΑΙΤΗΒΟΤΑΠ .
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 10 ΡΑΜΜΑΤΕΑΕΠΗΝΗΣΘΑΙΔΕΚΑΙΤΟΤΣΔΙΚΑΣΤΑΣΤΟΤΣΠΑ .
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 15 ΜΒΟΤΑΗΝΚΑΙΤΟΝΔΗΜΟΝΗΡΩΤΟΙΣΜΕΤΑΤΑΙΕ
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 20 Σ . . . ΠΟΗΣΑΣΘΑΙΤΟΤΣΑΓΩΝΟΘΕΤ . ΣΤΟΥΜΟΤΣΙΚΟΤΙΝΑΔΕΚΑ .
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 25 ΤΕΤΩΝΑΝΔΡΩΝΚΑΛΟΚΑΓΑΘΙΑΝΚΑΙΤΗΝΕΥΝΟΙΑΝ . ΝΕΧΟΜΕΝ
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 30 ΦΗΙΕΙΣΤΗΑΗΝΛΙΘΙΝΗΚΑΙΑΝΑΤΕΘΗΠΑΡΑΤΤΟΙΣΕΝΤΩΙΕ
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 ΔΗΣΗΓΙΑΣΑΓΩΡΟΤΑΝΑΣΑΓΩΡΑΣΔΙΟΝΤΣΙΟΥ

- ρια
- δῆμος φαίνεται τὸς κα
- τοῖς καλοῖς καὶ ἀγαθοῖς τῶν ἀνδρῶν
- παραγίνονται ἄνδρες ἄξιοι τοῦ δήμου εἰδ-
- 5 [ότες τὴν ὑ]πάρχουσαν εὐχαριστίαν, δεδόχθαι τῇ βουλῇ
 [καὶ τῷ] δήμῳ ἐπηνῆσθαι τὸν δήμον τὸν Ἀσσίῶν ἐπὶ τ[ῆ
 εὐνοίᾳ ἣ]ν ἔχει πρὸς ἡμᾶς, καὶ στεφανοῦσθαι αὐτὸν ἐν τοῖς
 τοῖς Διονυσίοις, αὐλητῶν τῇ πρώτῃ ἡμέρᾳ, χρυσῷ στε-
- 10 [φ]άνῳ, ἐπὶ τῷ ἀποστεῖλαι δικαστὰς καλοὺς κάγαθοὺς κα[ὶ]
 [γ]ραμματέα, ἐπηνῆσθαι δὲ καὶ τοὺς δικαστὰς τοὺς πα-
 ραγενομένους, Ἐχέλαον Ἀθηναγόρου Λάτιμον Κλεομόρ-
 [γ]ου, καὶ στεφανῶσαι ἐκάτερον αὐτῶν χρυσῷ στεφάνῳ, ἐπ[ὶ]
 [τῷ] τὰς μὲν διαδικάσαι τῶν δικῶν [ἴσως] καὶ δικαίως, τὰς
 [δὲ διαλ]ύσαι ἀπὸ παντὸς τοῦ βελτίστου, ὑπάρχειν δὲ αὐτο[ῖς]
- 15 [τῆ]μ βουλὴν καὶ τὸν δῆμον πρώτοις μετὰ τὰ ἱε-
 ρά· ὑπάρχειν δ' αὐτ[ο]ῖς καὶ προξένους τῆς πόλεως ἡμῶν· στε-
 φανῶσαι δὲ [κ]αὶ τὸν γρα[μμα]τέα, Μέλαγχρον Μελάγχρου, θαλε-
 ρῷ στεφάνῳ, ἐπὶ τῷ παρασχ[ε]σθαι τὴν καθ' αὐτὸν χρεῖαν μετὰ
 πάσης φιλοτιμίας· τῆς τε ἀναγγ[ε]λίας τῶν στεφάνων τὴν ἐπ[ὶ]
- 20 [στασιν] ποήσασθαι τοὺς ἀγωνοθέτας τοῦ μουσικοῦ. Ἴνα δὲ κα[ὶ]
 Ἀσσιοὶ εἰδήσωσιν τὴν τε τῶν ἀνδρ[ῶν] καλοκαγαθίαν καὶ τὴν
 τοῦ δήμου εὐχαριστίαν, αἰρεθῆναι πρεσβευτὰς οὔτινες ἀφικό-
 μνοι πρὸς αὐτοὺς ἐπε σὶν τε τὴν [β]ουλὴν καὶ τὸν δῆ-
 μον τό τε ψήφισμα ἀποδώσουσιν αὐτοῖς κα[ὶ ἀπ]οφανιοῦσιν τῆ[ν]
- 25 τε τῶν ἀνδρῶν καλοκαγαθίαν καὶ τὴν εὐνοίαν [ἣ]ν ἔχομεν
 πρὸς τὸν δῆμον αὐτῶν, καὶ παρακαλέσουσιν Ἀσσίους καὶ πα-
 ρ' αὐτοῖς ποήσασθαι τὴν ἀναγγελίαν τῶν σ[τ]εφά-
 νων ὑπὸ τοῦ κατασταθησομένου ἀγωνοθέτου [τ]οῦ
 μουσικοῦ ἀγῶνος· προνοῆσαι δὲ ἵνα καὶ τὸ ψήφισμα ἀνα[γρα-]
- 30 φῆ εἰ[ς] στηλὴν λιθίνην καὶ ἀνατεθῆ παρ' αὐτοῖς ἐν τῷ ἐ-
 πιφανεστάτῳ τόπῳ. Πρεσβευταὶ ἡρήθησαν Κλεομή-
 δης Ἡγασαγόρου, Ἀναξαγόρας Διονυσίου.

. . . [That] the people may appear [duly grateful (?)] to noble and good men [and that] men may come to us who are worthy of the people, knowing the gratitude which is in store for them, be it enacted by the senate [and the] people, that the people of the Assians be thanked [for the good-will which] they have for us, and be crowned with a golden crown at the . . . Dionysia, on the first day of the flute-players, inasmuch as they have sent us good and honorable judges, together with a clerk; and further, that the judges who came to us, Echelaos, son of Athenagoras, and Latimos, son of Kleomorgos, be thanked and be crowned each with a golden crown, inasmuch as they gave judgment in some of the suits [equitably] and justly, and settled others amicably in the best possible manner; that they have [access to] the senate and people the first after the sacrifices, and that they be consuls of our city; further, that the clerk Melanchros, son of Melanchros, be crowned with a wreath of leaves, inasmuch as he has performed his duties with all zeal; and . . . that the overseers of the musical contest be charged with the proclamation of the crowns. And in order that the Assians may be made aware of the excellent character of these men, and of the gratitude of our people, be it further enacted that ambassadors be appointed who shall go to them and [thank] their senate and people, and deliver to them this decree, and shall make known to them the good character of these men and the good-will which we have for their people, and shall invite the Assians to make proclamation of the crowns in their own city also, through the overseer who may be appointed to superintend the musical contest, and to see that this decree be cut upon a stone pillar, and set up in the most conspicuous place in their city. Kleomedes, son of Hegiasagoras, and Anaxagoras, son of Dionysios, were appointed ambassadors.

Line 8. *ἀλλητῶν τῇ πρώτῃ ἡμέρᾳ*: cf. Aeschines in Ctes. § 45, *κηρύττεσθαι τοῖς τραγωδοῖς*, and the spurious decree in Demosth. Cor. § 118, *Διονυσίοις τραγωδοῖς καινοῖς*, with the corrupt expression in the spurious indictment (*ibid.* § 54), *Διονυσίοις τραγωδῶν τῇ καινῇ*.

Line 12. ΣΤΕΦΑΝΩΝ is the stonecutter's mistake for ΣΤΕΦΑΝΩΙ.

Line 13. ΙΣΣΩ must be a mistake for ΙΣΩΣ or ΟΣΙΩΣ.

Line 16. Perhaps for *ὑπάρχειν δ' αὐτοῖς καὶ προξένους* we should read *ὑπάρχειν δὲ γενέσθαι προξένους*.

Line 23. The word here needed seems to be *ἐπαινέσουσι*, which might be spelled *ἐπενέσουσι*; but Mr. Lawton reports that the fifth letter is circular (Θ, Ο, or Ω), and the copy from the stone gives the ending ΕΣΣΙΝ, but with only the first Σ certain.

Phonetic spellings, as *τῆμ βουλῆν* (l. 15), *τὸν γραμματέα* (l. 17), *βουλῆν καί* (l. 23), will be noticed; as also occasional omission of I in HI and ΩI, and careless insertion of I after H and Ω.

III.

THIS is a fragment of a decree of the Roman period, entitled *περὶ τοῦ μὴ καθίστασθαι πράκτορας*. We have chiefly the preamble, of which the last lines are imperfect. The inscription has the late forms ϵ and ω for Σ and Ω , and omits I entirely in η and ω .

ΔΟΓΜΑ ΠΕΡΙ ΤΟΥ ΜΗ ΚΑΘΙΣΤΑΣΘΑΙ ΠΡΑΚΤΟΡΑΣ
 ΓΝΩΜΗ ΒΟΤΑ Η ΕΣΤΕ ΚΑΙ ΔΗΜΟΤΑ ΔΙΧΟΝΤΩΝ ΔΟ
 ΓΜΑΤΟ ΓΡΑΦΩΝ ΕΙ Η ΑΝΘΟΥ ΕΣΤΟΤΕΡ ΜΟΓΕΝΟΥ Ε
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 5 ΚΟΥ ΤΟΥ ΜΕΝ ΕΛΘΕΩ Ε . . ΕΠΕΙ ΔΗ Ο ΚΟΙΝΟ ΣΑ ΠΑΝ
 ΤΩΝ ΕΚ ΠΡΟΓΟΝΩΝ ΕΤΕΡΓΕΤΗ ΕΣΤΙ Χ ΚΑ Χ ΝΕΙΚΑ
 ΕΙ ΕΣΤΝΑ ΠΑΙΝΟΙ ΕΣΤΑΛΛΟΙ ΕΤΕΡΓΕΤΗ ΤΗΝ ΠΑ
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 10 ΝΟΙΑ Ν ΚΑΙ ΤΗ ΕΣΤΗ ΜΕΡΟΝ Η ΜΕΡΑ ΒΕΒΟΤΑ Η ΤΑΙ
 ΝΟΜΟ ΘΕΤΗ ΕΙ ΕΣΤΟΝ ΑΙΩΝΑ . . ΤΑ ΕΣΤΗΝ ΑΙ ΤΗ
 ΚΟΙΝΗ ΕΤΕΡΓΕΤΙΑ ΕΣΤΑΙ ΠΙΚΡ . . ΜΕΓΑΛΟ ΤΦΟΡ
 ΤΙΟΥ ΤΗΝ ΠΑΤΡΙΔΑ ΚΟΥ Ο ΣΑΝ ΔΕ ΕΣΟ
 ΜΕΝ Ο ΕΣΤΗΝ ΤΩΝ ΠΟΛ ΚΤΟΡΩΝ ΠΡΑ
 15 ΞΙΝ ΔΕ ΔΟΧΘΑΙ ΤΗ Η ΜΩ ΚΑΙ ΤΟΙ Ε
 ΠΡΑΓΜΑΤΕ ΤΟ Μ Ω ΜΑΙ ΟΙ ΕΣ ΕΠΗ
 ΝΗ ΕΣΤΑΙ ΜΕΝ Χ Τ ΤΟΝ ΑΡ . .
 ΤΑ ΕΣΤΟΝ ΤΑ
 ΤΑ ΚΑΛΛΙ ΕΣΤ
 20 ΠΙΚΕ ΦΑ
 ΕΣΤΡΑ
 ΑΓ . ΟΜΟ
 ΤΗΝ ΚΑΤΟΡΘ
 ΠΡΑΚΤΟΡ
 25 ΞΕΝΙΚ
 ΤΟΥ Τ
 ΤΟ

- Δόγμα περὶ τοῦ μὴ καθίστασθαι πράκτορας.
 Γνώμη βουλῆς τε καὶ δήμου, λαχόντων δο-
 γματογράφων Ἐπάνθους τοῦ Ἐρμογένους
 Ἐρμογένους τοῦ Ἐπάνθους Κρατησινεί-
 5 κου τοῦ Μενεσθέως. Ἐπειδὴ ὁ κοινὸς ἀπάν-
 των ἐκ προγόνων εὐεργέτης Τι. Κλ. Νεικά-
 σις σὺν ἅπασιν οἷς ἄλλοις εὐεργέτι τὴν πα-
 τρίδα, κοσμῶν τὸ ἑαυτοῦ γένος, ἐν παντὶ και-
 ρῷ ἐνδεικνύμενος τὴν εἰς τὴν πατρίδα εὐ-
 10 νοιαν καὶ τῇ σήμερον ἡμέρα βεβούληται
 νομοθέτης εἰς τὸν αἰῶνα . . τὰ ἐς τὴν λιτη-
 κοιῆς εὐεργεσίας καὶ πικρ μεγάλου φορ-
 τίου τὴν πατρίδα κου ος ἀναδεχό-
 μενος τὴν τῶν πολ[ιτικῶν πρα]κτόρων πρῶ-
 15 ξιν, δεδόχθαι τῇ [βουλῇ τε καὶ τῷ δή]μῳ καὶ τοῖς
 πραγματενομ[ένοις παρ' ἡμῖν Ἱ]ωμαίοις ἐπη-
 νῆσθαι μὲν Γ τὸν ἄρ[ισ-]
 τα λέγοντα
 τὰ κάλλιστ[α]
 20 πικεφα
 στρα
 αγ . ομο
 τὴν κατορθ
 πρακτορ
 25 ξενικ
 τουτ
 το

IV.

A SEPULCHRAL inscription, found, Sept. 12, 1881, on a large trachyte block at the beginning of the street of tombs in Assos.

ΠΟΠΛΙΩΙΟΤΑΡΙΩ
 ΠΟΠΛΙΩΤΤΙΩΙΑΝΙΗΝΣΙΣ
 ΑΚΤΙΛΑΙ

Ποπλίω Οὐαρίω
Ποπλί[ο]υ υἱῶ Ἀνιῆνσις
Ἀκυίλα

P. Vario
P. F. Aniensis
Aquilae

If the copy is correct, we have the genitive Ποπλίω. Ἀνιῆνσις represents the Latin genitive *Aniensis*.

V.

THIS inscription, of the Roman period, is the touching tribute of a Lesbian youth, named Anaxeos, to the memory of his dog Parthenope. Similar epitaphs of animals may be found in the Anthol. Palat. vii. 207, 208, 211, 212. A figure of the dog in bas-relief is cut upon the stone above the inscription. The stone was found in Mytilene, in the autumn of 1880, by workmen who were digging the cellar of a mill.

ΠΑΡΘΕΝΟΠΗΝΚΤΝΑΘΑΨΕΝΑΝΑΞΕΟΧΗΤΝΑΘΤΡΕΝ
ΤΑΥΤΗΝΤΕΡΠΩΛΗCΑΝΤΙΔΙΔΟΤCΧΑΡΙΤΑ
ΕCΤΑΘΛΟΝCΤΟΡΓΗCΑΡΑΚΑΙΚΤCΙΝΩCΝΤΚΑΙΗΔΕ
ΕΥΝΟΤCΟΤCΑΤΡΟΦΕΙCΠΜΑΛΕΛΟΝΧΕΤΟΔΕ
ΕCΤΟΔΟΡΩΝΧΡΗCΤΟΝΗΠΙΟΤΦΙΛΟΝΟCΕΠΡΟΘΤΜΩC
ΚΑΙΖΩΝΤΑCΤΕΡΓΟΙΚΑΙΝΕΚΡΟΝΑΜΦΙΕΠΟΙ

Παρθενόπην κίνα θάψεν Ἀνάξεος, ἧ συνάθυρεν,
Ταύτην τερπωλῆς ἀντιδιδούς χάριτα.
Ἔστ' ἄθλον στοργῆς ἄρα καὶ κυσίν, ὧς νυ καὶ ἦδε
Εὐνους οὔσα τροφεί σῆμα λέλονχε τόδε.
Ἔς τόδ' ὄρων, χρηστὸν ποιῶ φίλον, ὅς σε προθύμως
Καὶ ζῶντα στέργοι καὶ νεκρὸν ἀμφιέποι.

Parthenope his dog, with whom in life
It was his wont to play, Anaxeos here
Hath buried : for the pleasure that she gave
Bestowing this return. Affection, then,
Even in a dog, possesseth its reward,

Such as she hath who, ever in her life
 Kind to her master, now receives this tomb.
 See, then, thou make some friend, who in thy life
 Will love thee well, and care for thee when dead.

H. G. C., Jr.

VI.

FOUND at Mytilene, in April, 1881.

ΗΡΩΣΧΑΙΡΕ
 ΖΗΤΑΕΤΗΜΗΝΕΙΑ
 ΗΜΕΡΑΚΕ

Ἡρώς χαίρε·
 ζήσας ἔτη ἑ μῆνες ια
 ἡμέρας κε.

II.

NOTES ON BUNÁRBASHI AND OTHER SITES IN THE TROAD.

BY WILLIAM C. LAWTON.

ΗΜΕΙΣ ΔΕ ΚΑΕΟΣ ΟΙΟΝ ΑΚΟΥΟΜΕΝ ΟΥΔΕ ΤΙ ΙΔΜΕΝ.

PRELIMINARY NOTE.

[THE identification of the site of Homeric Troy has long been a subject of animated controversy among those scholars who believe that the Iliad is a more or less literal account of events which actually happened, or that it has at least a considerable foundation of fact. In 1785-86 Lechevalier explored the Troad, and identified Bunárbashi as the Ilios of Homer. Since his time other archæologists have advocated the claims of Chiblak² and of Atchi-kieui;³ but their theories were never widely accepted, and seem finally disproved by the investigations made lately upon these sites by Dr. Schliemann. The dispute now, therefore, lies between the rival pretensions of Bunárbashi and Hissarlik, which latter place is recognized by the common consent of most archæologists of note as the Hellenic Ilium, the so-called "Ilium Novum." The inhabitants of Ilium maintained a tradition that the Trojan Ilios had not been destroyed completely by the Achæans, and had never ceased to be inhabited. They even pointed out in their city many features which had survived the ruin of its famous predecessor. We cannot, however, allow much weight to local traditions of this character, which rest often upon very weak foundations — as in Italy to-day, many towns are abandoning their good old names, some of which are Hellenic, and older than the name of Rome itself,⁴ to adopt, often upon quite insufficient grounds, those of Roman municipia.

¹ Lechevalier: *Description of the Plain of Troy*. London, 1799.

² Clarke. — Philippe Barker-Webb: *Topographie de la Troade Ancienne et Moderne*. Paris, 1844.

³ Ulrichs: *Reisen und Forschungen in Griechenland*, 1840.

⁴ François Lenormant: *La Grande Grèce*. Paris, 1881.

It is established by Professor R. C. Jebb¹ that "in the belief of the ancient world" — except of the people of Ilium, who were influenced originally, doubtless, by a natural inclination to magnify the importance of their native city, and except, too, of Alexander the Great and the Romans, whose acceptance of the tradition of the Ilians was uncritical, and actuated by motives of self-interest — Homeric Troy "had ceased to be inhabited when it was sacked by the Achæans, and its site had ever afterwards remained desolate. This was not an accidental detail of the ancient tradition, but a capital and essential feature. If so much of Troy had been spared that the old inhabitants could continue to occupy it, the ten years' siege would, in the feeling of the old world, have ended with an abject anti-climax. The gods who had fought for the Achæans would have been robbed of their due triumph over the gods who had fought for the Trojans."

Thus the ancients did not believe that the Hellenic Ilium occupied the site of Troy. It is, however, entirely possible that the Hellenic Ilium, which was probably founded centuries after the destruction of Troy, — perhaps as late as the reign of Croesus,² — and long after all tradition of its exact site had disappeared, may have been established, unintentionally and unknown to its founders, upon the accursed spot.

Criticism of the text of Homer affords arguments apparently strong in favor alike of Hissarlik³ and of Bunárbashi.⁴ The question must therefore be decided, if at all, by excavation.

The great extent of Dr. Schliemann's work at Hissarlik is well known. Whatever bearing his discoveries may have upon the Iliad, the unearthing there of six (or more⁵) cities buried one beneath the other, is an archæological acquisition of the highest importance; and the pottery and the metallic implements and ornaments found in the four lower strata of débris, form, with those of Thera, the earliest material that we have for the study of primitive Greek civilization.⁶ At Bunárbashi the only archæological investigation of any extent that has been made is that

¹ *Journal of Hellenic Studies*, ii. 1, — "Homeric and Hellenic Ilium." All who are interested in the subject should read this important article. Cf. Mr. W. J. Stillman's letter on the "Site of Homeric Troy," in the *Nation* of May 5th, 1881.

² Professor Jebb: *loc. cit.*

³ Schliemann: *Ilios*; Professor A. H. Sayce: *Journal of Hellenic Studies*, i., "Notes from Journeys in the Troad and Lycia"; Émile Burnouf: *Mémoires sur l'Antiquité*, "Troie"; Virchow and others.

⁴ Nicolaïdes: *Topography and Strategy of the Iliad*; W. J. Stillman; Curtius and others.

⁵ Professor A. H. Sayce.

⁶ M. Collignon: *L'Archéologie Grecque*. Paris, 1881. Cf. the study on "Troie," in the work of M. Burnouf above referred to.

of Herr von Hahn in 1864.¹ But his work was too incomplete to produce results of importance.

In September of last year three members of the Expedition of the Institute at Assos — Messrs. Diller, Walker, and Lawton — made a summary examination of the Trojan Plain, with the view especially of determining the desirability of undertaking further investigations upon the Acropolis of Bunárbashi, or elsewhere in the neighborhood. The observations of the party and the conclusions arrived at by them have been embodied by Mr. Lawton in the following Report upon their excursion. — T. W. L.]

During the autumn of 1881 a party was sent from Assos to the Trojan Plain, to examine the little Acropolis of the "Bali-dagh," above Bunárbashi village, and to report on the desirability of continuing the excavations of Von Hahn. The ruined classic city now called Chigri was visited on the way northward. This site is very little known, and the determination of its ancient name might perhaps aid in the solution of some of the problems of classical geography which await us in the Trojan Plain proper. A few notes on other famous localities and much-debated questions have been added. The Troad has been so seldom visited that it is hoped that the testimony of unprejudiced eye-witnesses will be of some interest. Little of what we tell is new; but we have tried to see with our own eyes, and not to quote at second-hand. The ascent of Ida was made in October by a party on foot, who skirted the whole northern shore of the Gulf of Adramyttion, and, ascending from the town of the same name, returned through the Plain of Beiramitch.

Most of the topographical notes are to be credited to Mr. Diller. The drawings, and the plan of the city walls on the Bali-dagh, with the appended explanations, are the work of Mr. Walker. We are under great obligations to Mr. Frank Calvert for his hospitality and courtesy, and also for his most instructive guidance. Dr. Schliemann, with his usual kindness toward students, placed most freely at our disposal his rich library of works on the Troad.

CHIGRI.

MIDWAY on the journey from the Gulf of Adramyttion to the Hellespont is the little Turkish town of Iné, built on the west branch of the Méndereh, just above its junction with the main stream. For several miles before Iné is reached the road runs northward

¹ Von Hahn: *Ausgrabungen auf der homerischen Pergamos*. Leipzig, 1865.

with the river, crossing it at short intervals. In May there was a brisk stream, more than ankle deep and a dozen metres wide ; but in October the bed was quite dry. From this river road is seen prominently on the left the long ridge on which Chigri lies. At Iné there are tolerable khans and an excellent locanda, and the Greek inhabitants are intelligent and courteous. A visit to Chigri should be made from here in a single day, as the Turkish villages nearer the mountain can provide no tolerable accommodation.

The ancient city now called Chigri, identified by Mr. Calvert with the classic Neandreaia, is magnificently situated on a plateau more than five hundred metres above the sea. The walls extend along the ridge for over a kilometre and a half, and are to a great extent still standing in good condition. The courses of stone are somewhat less regular in their lines than the best work at Assos, and occasionally lapse suddenly into polygonal. The thickness of the wall where we measured it was 3.20 metres. The general structure was the same as at Assos, each side of the wall being neatly faced with smoothed stones, while inside the stones were left rough. The interval between the inner and outer faces of the wall was filled up with small stones.

The ground within the walls is approximately level, but with a considerable rise towards the northern end, as well as at the south end near the little Acropolis. Large rocks lie scattered over the surface, and the soil is as a rule very scanty. No hewn stone is seen, and in general little except the walls recalls the fact that a city once stood here. It would seem that the ground was never fully occupied (perhaps no very massive buildings were erected), that no later settlement came to accumulate débris above the Greek remains, and that the storms of twenty centuries have washed the hill almost bare of all traces of human habitation. Greek coms are often found here by the Turks of the village just below, who pasture their flocks within the walls.

The Acropolis is merely a precipitous hillock, covered with great fragments of natural rock piled high upon each other in the wildest confusion. From this point we obtained our first good view of the Trojan Plain. Just west of this elevation is a great gate in the city wall. Its jambs are still standing, and in one of them is a neatly cut slot, in which the hinge of the gate may have rested. Between

this gateway and the Acropolis was merely a re-entering angle of the wall ; but on the other side the entrance was commanded by a large square tower. Looking outward from this gateway, the visitor sees above, on the left, a curious bit of wall on the side of the Acropolis, in which two large rocks have apparently been utilized *in situ*.

Just outside the gate are half a dozen shallow graves, each lined with four rough slabs of stone. They were excavated by Mr. Calvert, who found in them pottery, which in his opinion forms a link between the art of the Lydian city of Hissarlik (the sixth, according to Dr. Schliemann's present numbering) and archaic Greek work. Most remarkable are the terra-cotta figures of an Egyptian or Assyrian type. Many of the vases are of a dark gray clay, and similar in form to those found at Hissarlik. Some scarabaei were found ; but these are supposed to be imitations. The fact that these graves were unroofed tends to strengthen the impression that this site was not occupied by later races.

If we can form any judgment from the contrast between these little graves just outside the great gate of Chigri and the magnificent street of tombs, crowded with exedrae and sarcophagi, in the corresponding position at Assos, we can infer that here there was never much display of wealth and splendor.

FROM INÉ TO BUNÁRBASHI.

We first saw the Méndereh, by general consent identified with the Homeric river Scamander,—

ὄν Ξάνθον καλέουσι θεοὶ, ἄνδρες δὲ Σκάμανδρον, —

in September, at a point an hour's walk north of Iné. It was running with a swift clear stream, half a metre deep at most, and half a dozen metres in width, winding among the banks of sand that fill its broad winter bed. Fish three or four inches long were abundant. The plain is here about two kilometres wide, and was at the time of our visit covered with maize. Further north the wooded hills close in, and for several hours the road follows the curves of the river around their bases. At last the path seems to be crowded down into the sand at the very brink of the river ; and

after leading wearily around a few long sweeping curves, it abandons the valley and strikes over the hills towards the left. Presently a crest is reached, and suddenly the Plain of Troy appears, extended at our feet. The minaret of Bunárbashi is already in sight below, and in descending towards it a glimpse is caught, above us on the right, of the tumuli upon the Bali-dagh. We are passing downward among the valonia oaks over the ground which Lechevalier covered with the lower town of his enormous Ilios. On the left, not far away, the regular cone of the Ujek Tepeh (supposed to be the tumulus erected by Caligula) is a prominent landmark, standing on a considerable elevation upon the western edge of the plain. Before us the Ménderch winds mile after mile through the level plain towards the distant strip of blue water, beyond which rise the islands of the Northern Ægean.

He who is fated to spend a night at Bunárbashi would perhaps do best to test the hospitality of "Zachariah's chiflik," the country house of a rich Christian Albanian on the edge of the village. In the strong enclosure, within which the stables and servants' quarters are built against the wall on three sides while the veranda of the house forms the fourth, he will find a reminiscence of Odysseus' palace, or of the enclosures throughout the Iliad, around which the lions are perpetually roaring and watching their chance to leap over the walls. He will be welcomed as Odysseus was, not by faithful old Argos, but by the dogs of Eumaios, —

ἔξαπίνης δ' Ὀδυσῆα ἴδον κύνας ὑλακόμωροι.
οἱ μὲν κεκλήγοντες ἐπέδραμον.

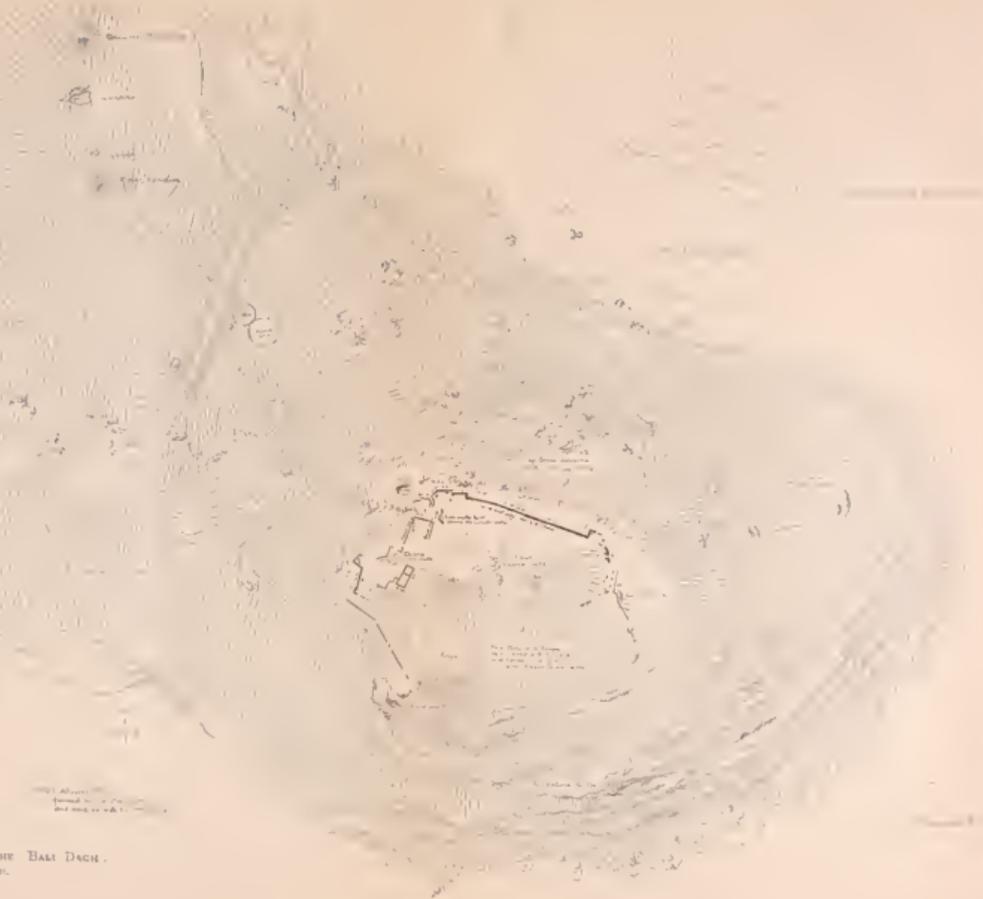
until the master appears, and

τοὺς μὲν ὁμοκλήσας σεῦεν κύνας ἄλλυδις ἄλλη
πυκνήσιν λιθάδεσσιν.¹

It is often wondered at that man's most faithful comrade has fared so ill in our proverbial expressions ; but the pedestrian in the East who, after being set upon at intervals all day by the wolfish

¹ "And suddenly the noisy dogs saw Odysseus :
With a yelp they flew at him.
. . . shouting, dispersed the dogs in all directions
With well-aimed stones." — *Odyssey* xiv. 29.

MAP
OF
THE ACROPOLIS OF THE BALI DACH.
OCT 1901.



shepherd dogs, comes at nightfall into the village only to be attacked by a yelping pack at the gate where he seeks shelter for the night, and who has seen and heard the filthy, maimed, blood-stained brutes that go howling in droves throughout the night in the larger cities of the Orient, will not wonder that to the Mussulman "dog" is the strongest expression of loathing and contempt.

THE BALI-DAGH.

The Acropolis of the Bali-dagh, identified by many writers since the time of Lechevalier as the Pergamos of Priam, is a striking eminence (rising some hundred and forty metres above the Hellespont) at the southern extremity of the Trojan Plain, overhanging the left bank of the Méndereh just where that river breaks from the mountains and flows out into the plain. As it is the last height on the west bank of the stream, it commands an unbroken view down the whole length of the plain. The Méndereh flows around it on three sides, at the base of steep cliffs. The only easy approach is over a comparatively narrow neck from the northwest. Its position will be clearly understood from the accompanying map and drawings. Plates II., III., IV.

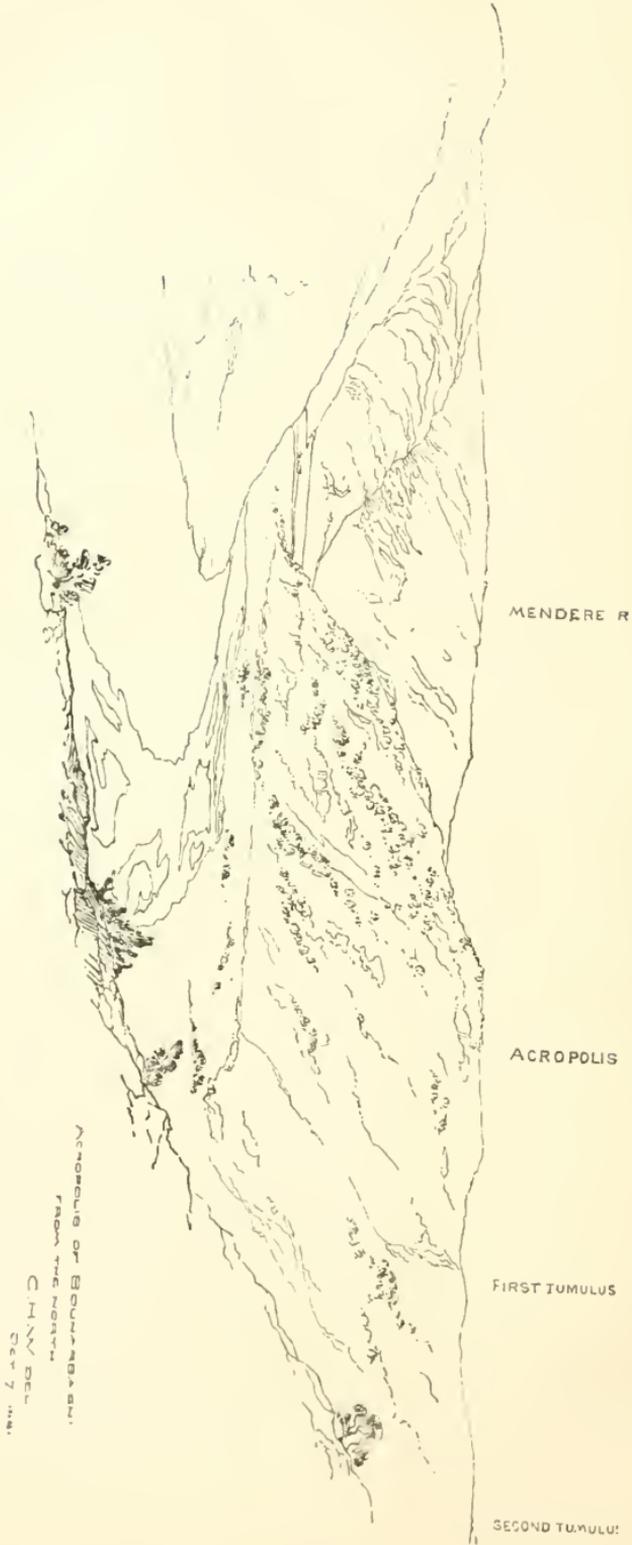
The walls which appear on the map were traced out and partially laid bare by Von Hahn, who, accompanied by Messrs. Schmidt and Ziller, of Athens, excavated here for three weeks only in May, 1864. He employed at first five laborers, afterwards twenty-two, and for the last three days thirty-six. His report is a small pamphlet of thirty-three pages, in the form of two letters to Mr. Finlay, the historian of Greece.

The walls are constructed chiefly of the crystalline limestone of which the mountain is formed. Indeed, immediately under the northwest corner of the city wall is a quarry of considerable size cut into the precipitous side of the hill. In this quarry is an old wild fig-tree, which bears excellent fruit. It will be noticed that on the south side the walls are not traceable. The native rock here is very scantily covered with soil. Occasional remnants of light house-walls appear, and others which seem to support a terrace of earth. In the whole eastern part of the city the rock strata of the hill appear often on the surface. In the middle and western portions there seems to be a considerable depth of soil.

Von Hahn's work consisted of little more than running trenches along the outer side of the walls, which have consequently at present the appearance of structures built to sustain the mass of earth within ; but this is doubtless because, since the abandonment of the city, soil has been washed down from the highest portion of the Acropolis, and accumulated against the inner side of the walls. In fact, it must be remembered that until excavations were made here the whole surface of the hill seemed to be a natural slope, and only the weather-worn upper course of the wall appeared on the surface, scarcely to be distinguished at first glance from natural boulders.

The space within the fortifications was less than two hundred metres long by about one hundred metres wide ; and within these compact limits lies almost everything of interest in connection with the site. On three sides, as we have said, there is a steep descent of limestone cliffs towards the river. Passing to the north-west along the plateau, we notice foundations in the form of two tangent circles, built of small rough stones carelessly laid together. The middle of each circle is slightly depressed. The circular walls rise very slightly above the surface. Virchow supposed these to be in the agora of the city. Von Hahn suggests the possibility of their having been threshing-floors, — though rather large for the purpose, considering their situation so far from the plain. At the point of tangency of these two circles Von Hahn dug down nearly a metre, but the character of the wall was the same at the bottom of his trench as above. It can hardly extend much deeper at any point, as the rock comes to the surface close by. South of these foundations, near the edge of the plateau, is visible one corner of the foundation-wall of a considerable building. The stones are rather large, and unhewn. Just beyond, an embankment runs across the plateau at its lowest point, whence there is a slight rise towards the city as well as towards the tumuli.¹ This embankment is composed of earth and small broken stones, and may be the remains of a rude wall which at one period marked the limit of the city. Turning to the left we find ourselves upon a spur running

¹ Three prominent tumuli along the slope of the Acropolis, which are referred to in all descriptions of Bunárbashi. They have been identified by some of the most zealous advocates of Lechevalier's theory as the tombs of Trojan heroes.



ACROPOLIS OF BOURZABADASI.
FROM THE NORTH.
CINN DEL.
Oct 7 1881.

MENDERES R

ACROPOLIS

FIRST TUMULUS

SECOND TUMULUS

up the stream of the Méndereh, towards which it presents a continuation of the steep rock face of the Bali-dagh proper. The soil is very scanty, and large rocks project from it on all sides. Nevertheless, Mr. Calvert has discovered and opened here an ancient cemetery. The bodies were placed in enormous earthen jars (*πίθοι*), and these were laid on their sides in the interstices of the rocks and covered with earth. In these jars was found some pottery of the fifth and fourth centuries B. C.

If, on the other hand, we turn northward upon passing the embankment, we shall go down a very regular slope, which brings us to the plain by the river side. Along the edge of this slope we see in succession the three tumuli, and, lower down, many considerable heaps of stones. The tumuli are themselves mere heaps of stone, in two cases mingled with earth. Two of them have been opened with very meagre results. They do not exhibit the structure described in Iliad xxiii. 255-56, and exemplified in the Tomb of Tantalos near Smyrna, the Tomb of Andromache near Pergamon, and many similar structures, —

*τορνώσαντο δὲ σῆμα, θεμειλιά τε προβάλλοντο
ἀμφὶ πυρήν. εἶθαρ δὲ χυτὴν ἐπὶ γαῖαν ἔχεναν.*¹

Close to the uppermost tumulus is a rudely circular excavation in the solid rock, which may have been an ancient quarry. Half way down to the second tumulus is another such quarry some twelve metres across. Close to the south side of the lowest tumulus is a circular wall, rising somewhat above the surface, and made of much larger stones than the two upon the plateau. This is perhaps the substructure of a tumulus which was never finished, or from which the earth has been quite washed off.

In the stone heaps Mr. Calvert showed us that the line of a wall could occasionally be traced, though disguised by the toppling over of its upper portion.² These may therefore have been house-walls. Here, again, any hope of fruitful excavation is frustrated by the

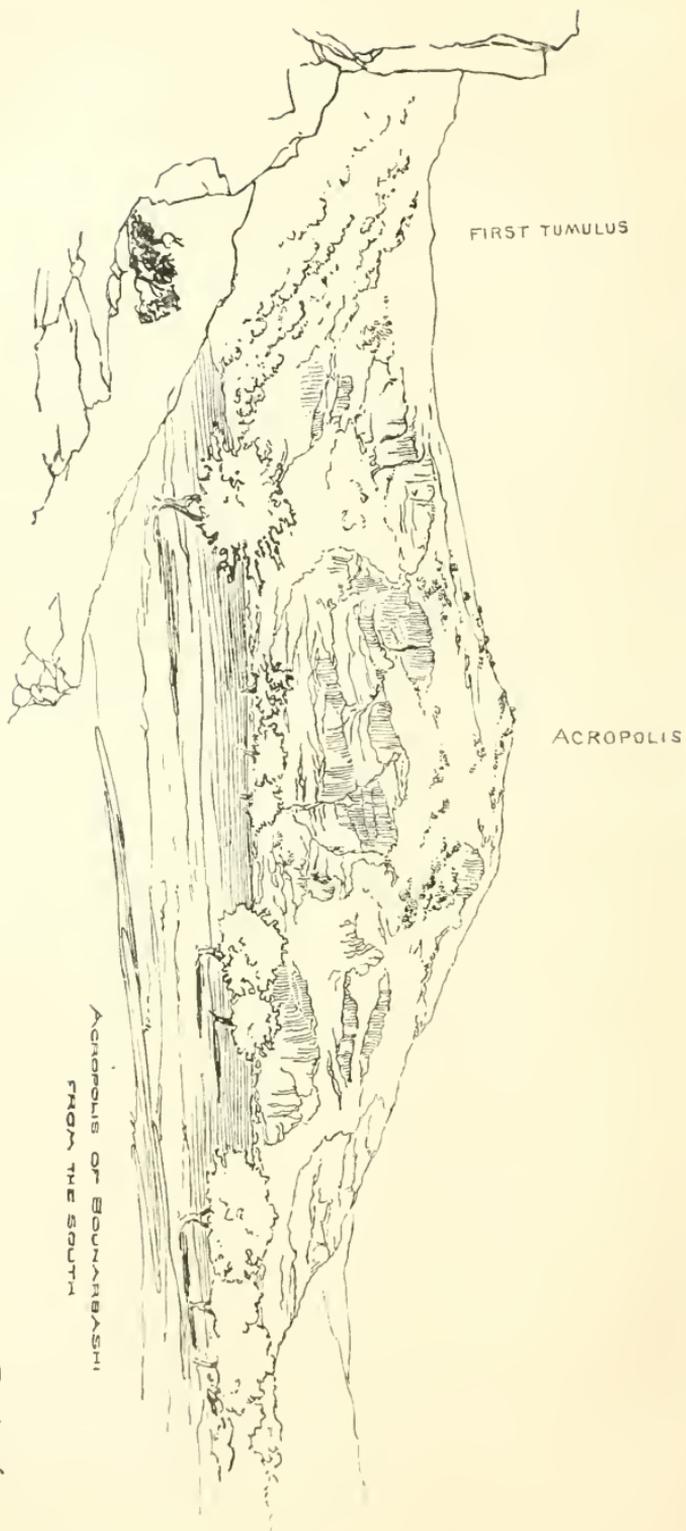
¹ "They rounded off the burial mound, and built a sustaining wall around it; then they poured libations upon the banked-up earth."

² Cf. Viollet-le-Duc, *Histoire de l'Habitation Humaine*, chap. xv., "*Les Pélasges*," and illustrations. Remains of similar circular house-foundations have been found elsewhere in Asia Minor, in Greece, in Italy, in Spain, etc.

rock of the hill, which appears in step-like layers all the way down the slope.

The descent from the Acropolis straight towards the village of Bunárbashi is rolling and gradual. The village is about a kilometre and a half from the Acropolis. On these slopes we failed, like other recent visitors, to find pottery or any other trace of human occupation. The soil is tolerably fertile, and gravel occasionally appears.

The haste with which Von Hahn worked may in part explain the fact that he found few coins or relics of any kind. Near the projecting terrace was unearthed a headless terra-cotta figure six inches high, of fairly good workmanship. This gave him the impression that a shrine or small temple may have stood here, as these statuettes were common votive offerings. By an ancient grave small bits of stucco were picked up, and also fragments of tiles of good workmanship which formed the covering of the grave. Two simple black-glazed lamps and fragments of a white pavement were found. Only sixteen coins came to light, of which four were identified as of Mytilene, three of Sigeion, two of Abydos, one each of Alexandria-Troas, Ilium, and Arcadia, all dating from the third or second century B. C. These were found "at no great depth." At the northeast of the square well-laid foundation-wall were found standing the stumps of two weather-worn unfluted columns, 40 centimetres in diameter, and respectively 120 and 90 centimetres high. A few clay waterpipes and tiles also came to light here. No inscription of any sort was discovered. If excavations are undertaken at Bunárbashi, it can hardly be with any hope of startling and brilliant discoveries. Von Hahn's experience has shown that the tangible return is likely to be small. Yet his work was only half done, and at some time ought to be completed. The popular interest in this region is a legitimate and desirable one. If an expedition should bring away nothing but a more accurate knowledge of this beautiful country, it would not have been sent in vain; while a simple inscription giving a clue to the name or age of the ancient city would be of the highest interest and value. The walls ought to be laid bare both inside and out, and the original level on which they were built accurately determined. The principal buildings which have already been discovered ought to be carefully cleared out. A series of pits should be sunk to determine with exactness the amount and character of the débris



ACROPOLIS OF BOUNARBASHI
FROM THE SOUTH

C. I. M. Ed.
Oct 7, 1881

accumulated within the walls. This could be done at a moderate expense, and a satisfactory judgment could then be formed as to what might yet remain to be done.

The earth could be disposed of easily by shooting it over the steep rocky cliffs, and there would be no danger of thus covering places which must afterwards be excavated. Tolerable quarters could probably be obtained in the neighboring village. An abundance of trained labor — thanks to Dr. Schliemann — can be secured in the vicinity.

To sum up, then: The thorough excavation of the Acropolis of Bunárbashi might give interesting results. If it finally laid the ghost of Lechevalier's Troy it would help the cause of peace as well as that of classical geography; but it would probably be by no means a rich field in the ordinary sense, and we should hesitate to urge its claims while so many sites in Asia Minor and in Greece proper, whence rich archæological returns are certain, are yet untouched by the spade.

[NOTES ON THE MAP OF THE ACROPOLIS OF THE BALI-DAGH.

The notes in quotation marks are taken substantially from Von Hahn's Report.

"Beginning at the northwest corner of the Acropolis outside the walls:

"*A* is a quarry 7 metres deep and 15 metres in diameter.

"*B*. The wall *B* is composed of blocks averaging $.60 \times .60 \times .20$, well cut and joined, resting on a projecting ledge which advances .05 metre, and is .15 metre high. The wall is of a yellowish stone, probably volcanic, radically different from the stone of the Bali-dagh and neighboring hills."

The foot of this wall is covered with débris; indeed the accumulation of débris is greater here than elsewhere, and makes it exceedingly difficult to trace any definite plan of the walls at this point. The exposed surfaces of the yellowish stone are disintegrating wherever found upon the Bali-dagh.

"Between the wall *B* and the bastion *DE* is a passage *C*, 1.40 metre in width, with side walls of the stone of *B*. The size of the blocks varies; largest, 55×1.90 metre. Two pilasters [of which nothing now remains] were found at the entrance, but no signs of a gate.

"Above the sides of this passage appear three courses of projecting blocks. Each successive course approaches its corresponding opposite

course more nearly than the next below; in this way undoubtedly was formed the roof of the passage. The walls below these courses are 1 metre in vertical height. There is no trace of walls beyond the angle shown on the plan."

This passage is now nearly filled with débris. We were unable to trace the walls around the angle, and the three roofing courses have entirely disappeared.

Above were numerous rough walls recently built, possibly to protect the sheep and goats pasturing here.

D, E "These remains, of what was apparently a bastion, consist of irregular blocks of about .50 X 1 metre, with rough and projecting split-face surfaces. The joints are well cut. The stone is from the quarry near at hand."

These bastion walls are now about 2 metres in height; the angles of the wall are carefully cut, so that a margin, perhaps 8 centimetres deep, is left smooth upon each face of the angle. The work is very similar to that upon the great gate at Assos.

The wall *G* is of the same character and workmanship.

F, G. "At the open space between *E* and *G* four rough steps led up to a wall *F*, of which, however, only three stones remain in place. Along the lower edge of these stones run three grooves with rounded edges." Remnants of the wall appear to extend behind *G*; but Von Hahn did not wish to destroy *G* in order to ascertain their exact disposition. The work and materials of *B* and *F* are similar; the walls, *D, E,* and *G,* Von Hahn thinks later additions.

F and the four steps are now covered with earth. Von Hahn's ditch has filled but little. *G* is, from the bottom of the ditch, 3.36 metres in height.

H. "The north wall, *H,* extends in a curved line towards the east, following the curve of the hill, varying in direction from 98° east at its juncture with the terrace *G,* to 110° east at the angle of *I.* It is built of smaller blocks than *D, E,* and *G,* more oblong than square, with rough faces and excellent joints. It is apparently of a different period from the bastion *D, E,* and the terrace *G.*"

Only the upper course of this wall is now visible above the soil; it appears never to have been excavated.

I, K. "The wall now comes forward and inclines at an angle of nearly 45°, which inclination continues eastward. We could find no gate between *I* and *K,* only fragments of possible walls."

The inclination in the wall running east is much less than that of the return wall.

The corner is built upon natural rock, which here comes to the surface.

The disposition, thickness, strength, and inclination of the walls would seem to suggest that they formed the base of a tower guarding the gate *Z*.

The stones have joints well cut; the courses follow the curve of the hill, which here descends rapidly.

The walls upon each side of the gate *Z* are in some places built upon the natural rock; the joints are excellently cut, the beds being absolutely level.

The passage into the city can be traced only a short distance, because of the débris of later light walls.

The east side of the Acropolis is covered with a confused mass of walls, of the age and use of which Von Hahn formed no conjecture. He could trace the city wall but little farther. Doubtless the Acropolis limits varied at different times. All attempts to follow the south wall were vain, until the southwest corner was reached; here a fine polygonal wall, largest stone 1 metre in height, was found. *X, Y.* Von Hahn thought this wall the oldest upon the hill. These walls incline at an angle of 69° . Von Hahn considered them the foundation of the city wall proper. From here eastward, the inner or lining wall is the only enclosure of the Acropolis. At this point the mass of débris is very great. Von Hahn considered *Z* the finest wall found. It has four courses, each 4.5 metres high; each course projects beyond the one above it; the surface of the courses has an inclination of 85° . — C. HOWARD WALKER.]

THE BUNÁRBASHI RIVER.

A short distance southwest of Bunárbashi are the springs called the "Forty Eyes." They are found in the old crystalline limestone near its junction with the tertiary limestone. In September — the driest month of the year — they were pouring out an abundance of cold, pure water, forming a swift and clear stream, along the banks of which grow thickets of rushes and willows. Turtles and frogs were abundant. This stream, slightly augmented at times by the surface drainage of the hills west of the Bali-dagh, forms a series of marshes along the western edge of the Trojan Plain, and what is left of it passes off at last through an artificial channel cut for it between the heights of Sigeion and Ujek Tepeh, to Besika Bay. Its natural course was traced by Forchhammer by the old channels, which are still filled when the river is at its highest. He shows that it formerly emptied into the present Ménderéh just above Yeni Sher. It must have been a mere thread of connection between swamps, in a part of the plain unfit for mili-

tary operations or human dwellings ; and it does not appear to be alluded to at all in the Iliad.

In this poor little rivulet Lechevalier recognized the *βαθυδιήεις Σκάμανδρος*, "deep-eddying Scamander." It is a valid objection to this, that it would make the whole twenty-first book of the Iliad, if we attempt to identify exactly the scenes of Homer, utterly meaningless. The fact is that the *Σκάμανδρος* is throughout Homer ὁ ποταμός, the great river of the plain, — that stream which, however its lower course may have changed, must have been for ages sweeping around the Bali-dagh on its way from Gargaros to the Hellespont. We will quote here one illustrative passage : —

τῶν ἔθνεα πολλὰ νεῶν ἄπο καὶ κλισιάων
 ἐς πεδῖον προχέοντο Σκαμάνδριον· αὐτὰρ ὑπὸ χθῶν
 σμερδαλέον κονάβιζε ποδῶν αὐτῶν τε καὶ ἵππων.
 ἔσταν δ' ἐν λειμῶνι Σκαμανδρίῳ ἀνθεμόεντι
 μῦριοι, ὅσσα τε φύλλα καὶ ἄνθεα γίγνεται ὄρη.¹

THE PLAIN.

The walk of fourteen kilometres from the Bali-dagh to Sigeion should be taken once by every student of the Iliad, though he may find it wearisome, and possibly monotonous. It will be heavy walking over the ploughed land and through the endless fields of maize ; but he will remember that under the very walls of the city Homer speaks of *πεδῖοιο πυροφόροιο*, and Athene, striving with Ares, hurls at him, —

. λίθον
 κείμενον ἐν πεδίῳ, μέλανα τρηχύν τε μέγαν τε,
 τὸν ῥ' ἄνδρες πρότεροι θέσαν ἔμμεναι οὖρον ἀρούρης,² —

¹ "The many tribes poured forth from ships and huts
 Into the Scamandrian plain. The earth
 Groaned fearfully beneath the feet of men and horses,
 And in the blooming Scamandrian mead they stood
 Countless as are the leaves and flowers of spring."

Iliad ii. 464.

² "A stone
 That lay upon the plain, black, rough, and huge,
 Which men of earlier days had set, to be
 The cornland's bound."

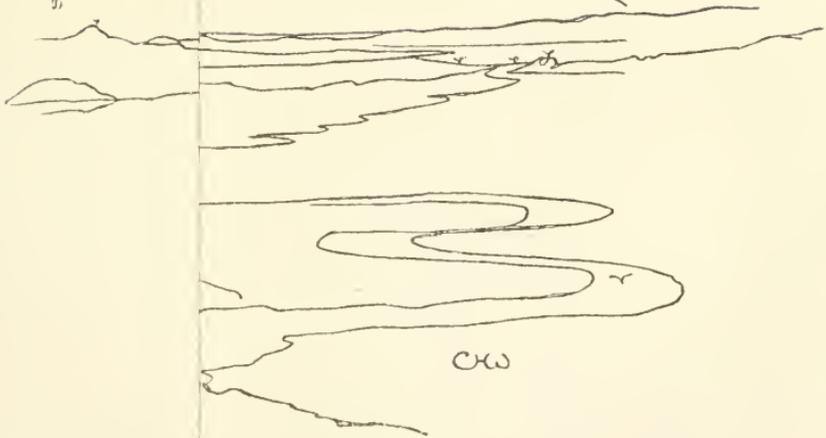
Iliad xxi. 403.

Second Tumulus—

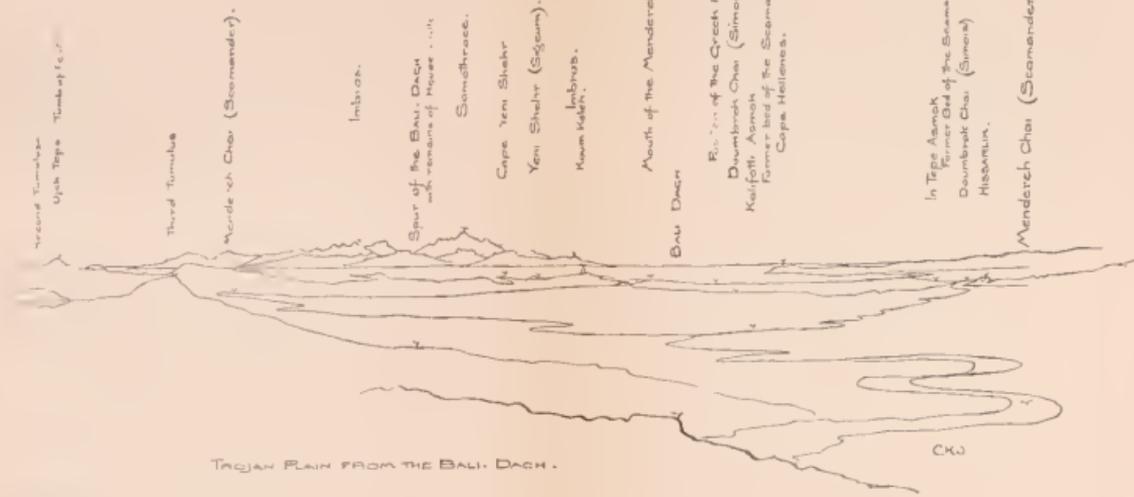
Ujck Tepe. Tomb of Fevnis.

In Tepe Asmak.
Former Bed of The Scamander.
Doubrek Chai. (Simois)
Hissarlik.

Menderek Chai (Scamander).



CU



TRAJAN PLAIN FROM THE BALI DAGH.

1883

from which it appears that the battle-field had long before been under cultivation. The pedestrian will come upon flocks of sheep and goats and herds of grazing kine. The bones of these animals were constantly found in the excavations made by Dr. Schliemann. On the night just mentioned, the Trojans drove out from the town βόας καὶ ἴφια μῆλα for their evening meal. Apollo is mentioned as tending the εἰλίποδας ἑλικας βούς of Laomedon, during his year of servitude, but it was, —

Ἴδης ἐν κνημοῖσι πολυπτύχου ὑλήεσσης.

Beside the river channels are growing πελέαι τε καὶ ἰτέαι ἠδὲ μυρῖκαι, and while pressing through the thickets the traveller is often held fast, like poor Adrestos, by the thorny tamarisk. There is no lack of marshes like that where Ulysses lay, —

κατὰ ῥωπήϊα πυκνά,

ἂν δόνακας καὶ ἔλος.

If the traveller starts up a heron, as we did near the “Forty Eyes,” it will recall to him the night when Diomedes and Odysseus set forth to visit the Trojan camp: —

τοῖσι δὲ δεξιὸν ἦκεν ἐρωδιὸν ἐγγὺς ὁδοῖο
 Πάλλας Ἀθηναίη· τοὶ δ' οὐκ ἴδον ὀφθαλμοῖσι
 νύκτα δι' ὀρφναίην, ἀλλὰ κλάγξαντος ἤκουσαν.¹

On such soil common sights and sounds are full of classic association. The eagle we roused up was an omen from Zeus, and the flock of great birds, — χηνῶν ἢ γεράνων ἢ κύκνων δουλιχοδείρων, — flying in circles and working their way up to a higher level, was a Homeric simile written in the sky. Every step onward leads to the conviction that the writer of the Iliad knew well the plain that was the scene of his heroes' struggles. It was no dreamland like Phaiakia, but the very ground beneath our feet.

SIGEION.

We sit upon the promontory in the cool sea-breeze and study the lovely panorama spread before us. The frame of the picture, at any rate, is unchanged, —

¹ “And Pallas Athene sent a heron for them,
 Close to their path on the right. They saw it not with their eyes
 Through the murky night, but they heard its cry.”

ὄψαι ἦν ἐβέλησθα καὶ αἶ κέν τοι τὰ μεμήλη,
 . . . Ἐλλήσποντον ἐπ' ἰχθυόειτα πλεούσας
 νῆας.¹

Out of the blue Ægean rise Tenedos, Lemnos, Imbros, and, soaring high above Imbros, the stately peak of Samothrake, — the watch-tower of Poseidon, — where

οὐδ' ἀλασκοπιὴν εἶχε κρείων Ἐνοσίχθων
 καὶ γὰρ ὁ θαυμάζων ἦστο πτόλεμόν τε μάχην τε
 ὑψοῦ ἐπ' ἀκροτάτης κορυφῆς Σάμου ἰληέσεως
 Θρηϊκίης· ἔνθεν γὰρ ἐφαίνετο πάντα μὲν Ἴδη,
 φαίνετο δὲ Πριάμοιο πόλις καὶ νῆες Ἀχαιῶν.²

Far away to the southeast we can descry the seat of his mightier brother, Zeus, —

ἐπ' ἀκροτάτης κορυφῆς πολυπίδακος Ἰδης.

These are the magnificent limits of Homer's "mythological background," as Virchow well expresses it.

Nearer at hand, we can trace the line of heights about the plain, and see the river descending from the far-away water-gap by the Bali-dagh. Opposite us stands Rhoiteion; and stretching from it towards us is the low sandy shore where the Greek ships lay, —

καὶ πλῆσαν ἀπάσης
 ἡϊόνος στόμα μακρὸν, ὅσον συνέεργαθον ἄκραι.³

The sandy spit of Koum Kaleh runs out boldly, and looks like a recent encroachment of the land upon the sea. The hypothesis of Strabo, that in Homer's day a deep bay extended inland between

¹ "You shall see if you will, and if you care for that,
 . . . ships sailing on the fishy Hellespont."

Iliad ix. 359.

² "The wide-ruling Earth-shaker kept no blind watch:
 For, wondering at the war and strife, he sat
 High on the topmost crest of woody Samothrake;
 Thence all Ida was in sight,
 And Priam's city and the Achaians' ships."

Iliad xiii. 10.

³ "And filled the broad mouth of all the coast
 Within the promontories' bounds."

Iliad xiv. 35.

the promontories, seems to be finally disposed of by the learned and searching essays of Mr. Calvert and Dr. Virchow. We are unable to see any allusion to such a bay in the Iliad. In the chief passage on the subject, from which we have just quoted, the poet says, —

. . . εἰρύατο νῆες
θιν' ἐφ' ἄλως πολιῆς.

At the beginning of the Twenty-third Book he says *νῆάς τε καὶ Ἑλλάσποντον ἴκοντο*. True, the expression *θαλάσσης κόλπον* also occurs; but its most natural and literal meaning is “the bosom of the sea.” Certainly that is the meaning of the same expression in xviii. 140, where Thetis bids her sisters

δῦτε θαλάσσης εὐρέα κόλπον,
δύσμεναι τε γέρονθ' ἄλιον καὶ δώματα πατρὸς,¹ —

for we do not imagine that any scholar would venture to place the home of Nereus in this hypothetical “bay of the sea”!

Decisive evidence on this subject would be the discovery of some human monument of undoubted antiquity near the present shore-line, or of remains of such character as to mark clearly a different shore-line further inland. A search for the wall built by the Greeks in the Seventh Book has been suggested. Apart from the difficulty of deciding where to seek it, it should be remembered that it was constructed hastily, in a single day and on a sandy shore, —

ἦμος δ' οὔτ' ἄρ' πω ἦως, ἔτι δ' ἀμφιλύκη νύξ,
τῆμος ἄρ' ἀμφὶ πυρῆν κριτὸς ἔγρευτο λαὸς Ἀχαιῶν,
δύσετο δ' ἥελιος, τετέλεστο δ' ἔργον Ἀχαιῶν,²

its utter destruction being meanwhile promised by Zeus (vii. 459–463), and afterwards described with more elaboration than its erec-

1 “Plunge into the broad bosom of the sea,
To behold the Ancient of the deep, and your father's halls.”

2 “And ere yet day was come, but twilight lingered,
A chosen band of Achaians arose about the pyre.

.
The sun set, and the Achaians' work was done.”

Iliad vii. 433–65.

tion (xii. 3-33). But, indeed, against all attempts to use the *Iliad* as a history or an itinerary, there is an earnest warning in the line we have made our motto.¹ In the text Thucydides read, the wall seems to have been built when the Greeks first landed; for the supposition that the historian wrote carelessly, with only a vague recollection of the Homeric account, is surely inadmissible. *ἐπειδὴ δὲ ἀφικόμειοι μάχῃ ἐκράτησαν (δῆλον δέ· τὸ γὰρ ἔρμα τῷ στρατοπέδῳ οὐκ ἂν ἐτειχίσαντο).*²

But where then is Troy? The distance from Ilios to the ships seems pretty accurately fixed by an abundance of accidental evidence. Dr. Schliemann has treated this question so exhaustively in his *Ilios*, that it is needless to pile up quotations upon it. Perhaps the clearest single passage is that where Idaios starts — probably from the agora before Priam's palace — at dawn, to carry his message to the ships, and is back again by sunrise, —

ἦῶθεν δ' Ἰδαῖος ἔβη κοίλας ἐπὶ νῆας.

The action waits until his return, —

*οἱ δ' ἔατ' εἰν ἀγορῇ Τρῶες καὶ Δαρδανίῳνες,
πάντες ὄμηγερέες, ποτιδέγμενοι, ὅππότε ἄρ' ἔλθοι
Ἰδαῖος· ὁ δ' ἄρ' ἦλθε, —*

¹ The chief arguments of Forchhammer, Virchow, Calvert, and Schliemann may briefly be summarized thus : —

(1) By comparison with the effect of other rivers of greater power, like the Nile and Ganges, it appears that all the alluvium the Méndereh brings down could not build the coast-line out many furlongs in three thousand years.

(2) The current of the Hellespont is strong enough to sweep away any deposit.

[Beyond the line of shore of to-day; but not if there was a bay. In this case, the shore-line might have been built out till it met the current, when the process would cease. — W. J. S.]

(3) The crumbling vertical banks of the Asmák mouths and lagoons show that the sea is rather encroaching than losing ground.

(4) If there were any considerable permanent deposit of alluvium, the first result would have been the filling up of the great lagoons of the lower plain.

(5) The forts at Dardanelles and Koum Kaleh were built respectively about four and two centuries ago; but no growth of the shore has occurred at those points since their erection. They still front directly upon the sea.

² “And when on their arrival they had won a battle, — as it is plain they had, else they could not have built a wall of defence for their ships.” — Thuc. i. 11.

and a few lines later, —

Ἡέλιος μὲν ἔπειτα νέον προσέβαλλεν ἀρούρας.¹

There are passages which indicate that the poet, in imagination at least, saw such a general picture as we are studying from Sigeion. Take, for instance, the passage where the gods μεθ' ὄμιλον . . . ἤλυθον ἀνδρῶν: the battle was then raging near the shore, and Athene urges on her beloved Greeks from close at hand, —

στᾶς' ὅτε μὲν παρὰ τάφρον ὄρυκτὴν τείχεος ἑκτός,
ἄλλοτ' ἐπ' ἀκτάων ἐριδούπων μακρὸν ἀΐτει.

But

αὔε δ' Ἄρης ἐτέρωθεν, ἐρεμνῆ λαίλαπι ἴσος,
ὄξ' ἔκατ' ἀκροτάτης πόλεως Τρώεσσι κελεύων,
ἄλλοσε πᾶρ Σιμόεντι θέων ἐπὶ Καλλικολώνη.²

There is one passage which seems to have been preserved from the oldest traditionary lore to aid us in our search for the site of Troy, —

κτίσσε δὲ Δαρδανίην, ἐπεὶ οὐ πω Ἴλιος ἰρή
ἐν πεδίῳ πεπόλιστο, πόλις μερόπων ἀνθρώπων,
ἀλλ' ἔθ' ὑπωρείας ᾗκεον πολυπίδακον Ἴδης.³

¹ "At dawn Idaios went to the hollow ships.

The Trojans and Dardanians in the agora
Sat all assembled, waiting for the coming
Of Idaios; and he came

. . Then the sun was just beginning to shine on the fields."

Iliad vii. 381-421.

² "Sometimes standing by the moat outside the wall,

Sometimes on the resounding promontories, she shouted afar.
And Ares, on the other side, roared like a black hurricane,
Shouting shrill orders to the Trojans, sometimes from the Acropolis,
Sometimes running along the Simois to Kallikolone."

Iliad xx. 49-53.

³ "He built Dardania; for holy Ilios,

The city of mortal men, was not yet founded in the plain,
But they yet dwelt on the foot-hills of many-fountained Ida."

Iliad xx. 216.

[If we are to take the *Iliad* as our literal guide, might not this passage refer simply to the change which took place, — as in most Hellenic cities, — when the Acropolis was cleared of dwellings and left, except in case of necessity of war, sacred to the gods, and occupied only by their temples, while the city proper was built beneath in the plain? — T. W. L.]

Now the city on the Bali-dagh (Bunárbashi) could hardly be more suitably described, at least as it appears from the lower plain, than on "the foot-hills of Ida." It may, then, be Dardania; but hardly the citadel of Troy.

But where, then, shall we look for Ilios? Not hopelessly over the flat expanse before us, for the city certainly had an Acropolis high enough to overlook the plain, since from it the gods often watched the battle. There seems to be but one possible site. From the distant boundary line of hills a long ridge descends towards us, dividing the plain into two river valleys. This ridge ends, within a few miles of us, in a little eminence, of which the name is familiar enough, for around it has raged, if not the glorious struggle of Homer, at least the second Trojan war — of words! It is in the plain, for the plain sweeps nearly around it. And yet we cannot resist a feeling of disappointment as we say, "What! only that little brown hillock?"

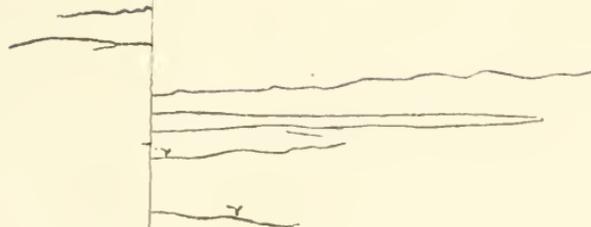
HISSARLIK.

We shall not attempt anything like a history or a description of Hissarlik, because Dr. Schliemann, in his exhaustive work *Ilios*, has already given to the world an account of the site and of his indefatigable labors upon it. These enormous trenches will for ages be a monument to Dr. Schliemann's energy and perseverance. We have found his descriptions of all portions of the Troad most accurate and complete, and his thorough familiarity with the *Iliad* leaves but scanty gleanings for those who follow him.

The only rest for the eye amid the desolation of Hissarlik is in the steadfast line of Greek wall along the top of the trenches. Striking architectural fragments from the Hellenic or Roman Ilium are lying about in the trenches or in the heaps of débris. Every lover of Greek art must desire that search should be made for the ruins and the remaining sculptures of the Apollo temple, after finding by chance so magnificent a metope as that of Helios conducting his four-horse chariot. To allow the earth to accumulate above the probable resting-place of its fellows, without searching for them, seems like almost too exclusive devotion to prehistoric discovery.

Whatever opinions may be held about the earlier occupation of this site, it must be remembered that here, without doubt, stood for

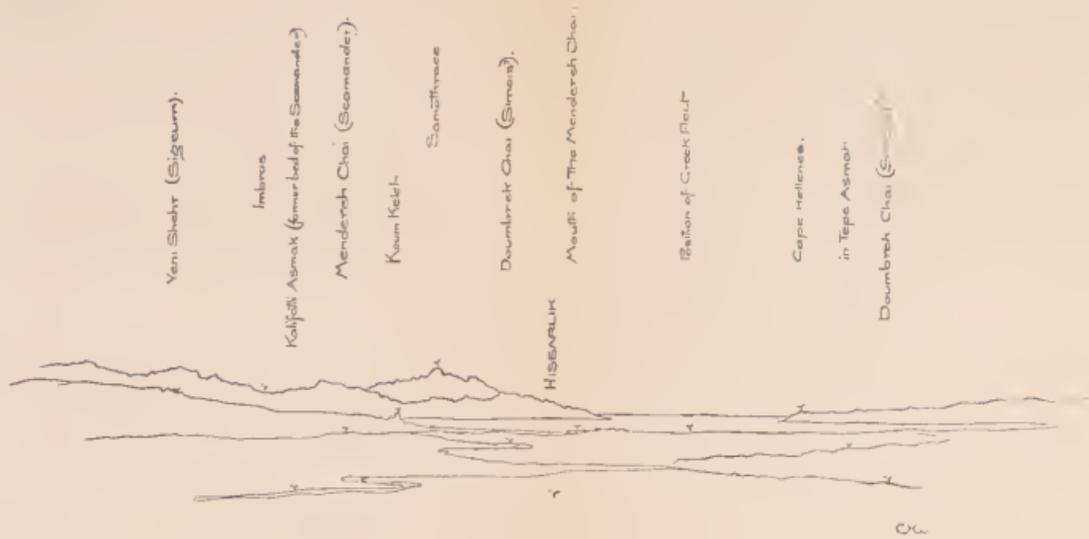
PLATE



In lepe Asmak.

Doumbrek Chai (Simis?)

33



TROJAN PLAIN FROM HISSARLIK.

many centuries the citadel of the Hellenic Ilium. Hither Xerxes and Alexander came to honor the memory of the heroes of Troy, and hither the Romans came to shower favors on the people from whom they were proud to claim descent. Such memories are surely honor enough for the little hill, whatever be the fate of its legendary claims.¹

We repeatedly saw Gargaros from Hissarlik, and it would doubtless be visible from the "town chief's" doorway if the later accumulations were entirely removed from the hill. We were not so fortunate as to get the sunset view of Athos, of which travellers often speak.

THE SCAMANDER.

From various passages in the Iliad it is clear that the Scamander and a lesser stream, the Simois, united between the city and the shore, and flowed into the Hellespont. The Scamander, moreover, passed very near the city walls. The Simois, no doubt, was usually dry, and the battle often raged in its dusty bed, —

Σιμόεις, ὅθι πολλὰ βοάγρια καὶ τρυφάλειαι
κάππεσον ἐν κονίησι, καὶ ἡμιθέων γένος ἀνδρῶν.²

This is not now the condition of things. The marshes to the north-east of Hissarlik are indeed drained by a stream, the Doumbrek, which may do duty for the Simois, but it is met below the city only by an unimportant stagnant creek called the Kalifatlí Asmák. The Méndereh

¹ The question, what belief the Greeks of historical times entertained in regard to the site of the Homeric city, is beset with great difficulties and contradictions. No reader of Dr. Schliemann's book can rest fully satisfied with his treatment of the deliberate conclusion of Strabo, the striking rhetorical expression of Lycurgus, and the ode of Horace, all of whom agree in this statement at least, that Priam's city was left utterly desolate, and never occupied again. A full and impartial discussion of this question will be found in Professor Jebb's article on the "Homeric and Hellenic Ilium" in the *Journal of Hellenic Studies* for April, 1881.

² "The Simois, where many shields and helmets
Fell in the dust: and the race of godlike men."

Iliad xii. 22.

The beautiful reminiscence of these lines in Virgil reads as if his text were different:—

"ubi tot Simois conrepta sub undis
Scuta virum galeasque et fortia corpora volvit."

is far away on the other side of the plain. To this difficulty the following solution has been offered: The Méndereh has within a comparatively short time changed its bed, whereas in Homer's day it flowed where the Kalifatli Asmák now is, and having received the tribute of the Doumbrek near the present village of Koum Kioi ("Sandville"), it emptied into the Hellespont, close to the promontory of Rhoiteion, through the channel known as the In Tepeh Asmák.

This explanation would certainly remove many difficulties. It would make just such a triangular battlefield on the north side of the town as is described by Homer. It would account, too, for the ford of the Scamander on the way from the ships to the town, often mentioned by the poet (xiv. 434, xxi. 2, xxiv. 693 κ. τ. λ.).

It is most natural that a student at a distance, especially one familiar only with Occidental rivers, should be surprised when he reads of so bold an alteration in the great feature of the plain; and he cannot but suspect that this is a hypothesis invented to remedy some fatal discrepancy between the alleged site and the poet's description.

One piece of evidence, or at least of illustration, especially satisfactory perhaps to those who cannot themselves make a careful study of the ground, has not yet, to our knowledge, been brought into the discussion. The next important river of the peninsula south of the Méndereh is the Touzla, which passes in sight of Assos, and is generally identified with the "fair-flowing Satnioeis" (Iliad vi. 34, xiv. 445, xxi. 87, Strabo, p. 605). Like the Méndereh, it breaks from the mountains some miles above its mouth, and flows to the sea through a level and fertile plain. This plain shows no trace of any change in the course of the stream, save one. Several hundred metres away from the present river bed are yet standing, almost intact, the arches of the Roman bridge. Within two thousand years the river has not only found a new course, but has completely effaced (doubtless by the alluvium deposited during inundations) all traces of the old channel.

The chief proofs advanced, that the great river of the Trojan Plain once flowed through the channel now marked by the Asmáks, are these. First, the great bar opposite the mouth of the In Tepeh Asmák, clearly shown by the three-fathom line on the Admiralty chart. Second, the fact that pits sunk along the channels of these creeks reveal syenitic sand and gravel, whereas the streams which now flow there deposit only black mud. This sand has apparently been brought

down by the river from a great mass of syenitic rock, now in an advanced stage of disintegration, which is traversed by the Méndereh above Evjilár. A similar formation in the north-eastern portion of the Chigri-dagh is also drained by tributaries of the Méndereh. Thirdly, along the course of the Kalifatlí Asmák many traces still exist of a great river bed which the present stream (even when augmented as it is in the winter by the overflow from the Méndereh) could not possibly have formed. The expressive Greek word *χειμάριος* (winter-running) cannot adequately be rendered. During much of the year nearly or quite dry, in the rainy season these streams flood the valleys through which they pass, and consequently in level plains they never form a deep, well-settled bed, and a slight cause may open a new channel.

We have described the Méndereh just north of Iné. Next day at Bunárbashi we were amazed to find the bed dry. On striking the limestone the stream had evidently sunk into the sand. A few miles below were pools haunted by turtles and frogs; but no running stream was visible. Yet Von Hahn measured the depth of the winter current, from brush deposited on the sides of the Bali-dagh, and found it reached fourteen metres. When we returned south in October the first heavy rains had fallen, and all the way up to Iné the river was flowing with a swift eddying current. The yellowish brown water was, even at the best fords, already above our horses' knees. It was less difficult to realize something of that imperious torrent into which the men of Ilios cast bulls and steeds, as sacrifices to the river-god.

In the imaginative Twenty-first Book we have allusions to this same condition of things in ancient times. In the floods with which Xanthus nearly overwhelms Achilles, and the subsequent drying up of the stream by the fires of Hephæstus, we can hardly fail to see a reminiscence, even though an unconscious one, of these furious winter floods and summer droughts.¹

¹ For a thorough study of the topography of the Troad, see Dr. Virchow's *Beiträge zur Landeskunde der Troas*; cf. Schliemann's *Ilios*; and for further details upon the elevation above the sea of various localities, and upon Mount Ida, see his *Reise in der Troas im Mai 1881*. Leipzig, 1881.

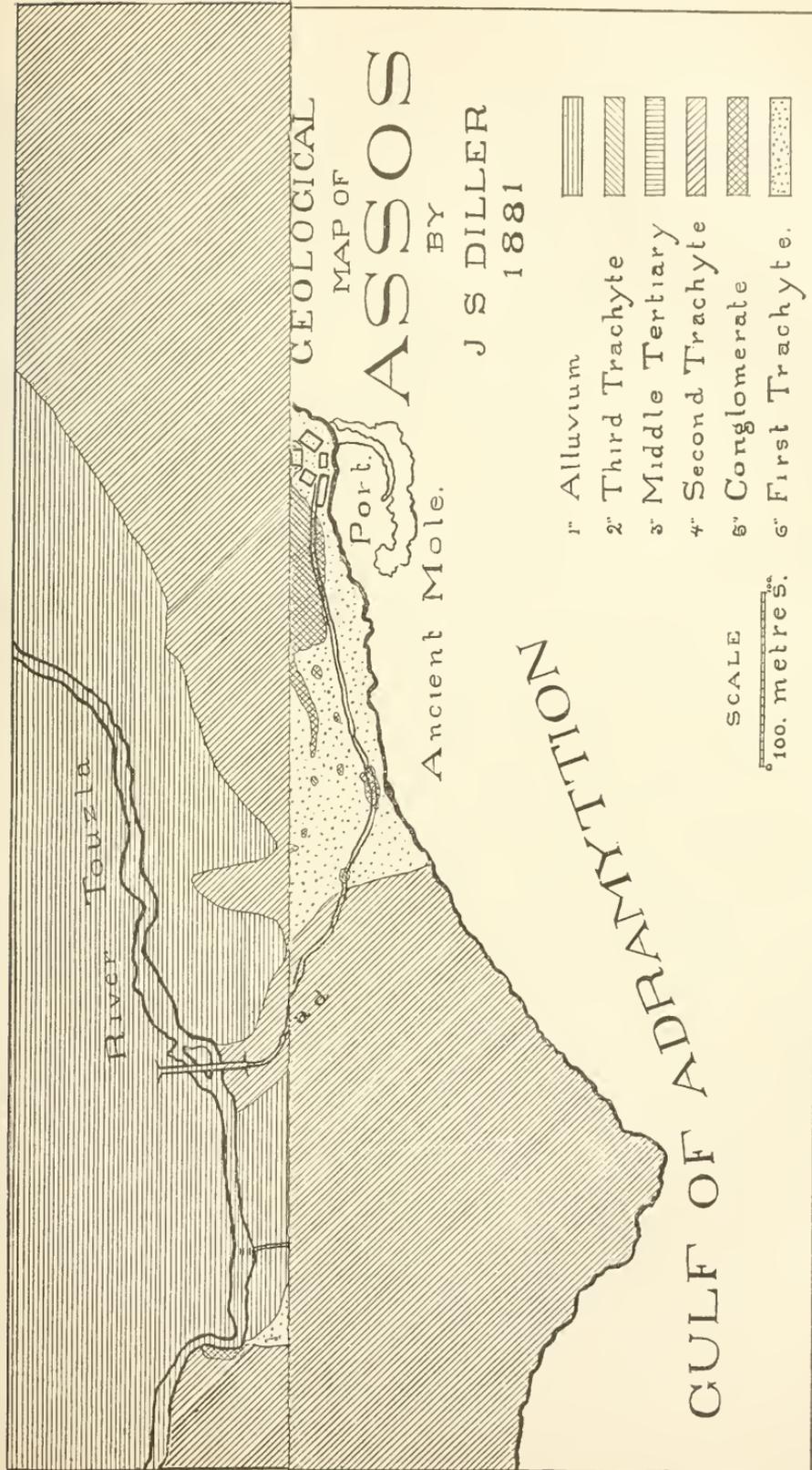
III.

THE GEOLOGY OF ASSOS.

By J. S. DILLER.

THE topographical isolation of the hill at Assos is apparent from many points of view in the southern part of the Troad, and its natural advantages as the site of an ancient fortified city were very great. Its form may be described, in a general way, as a truncated cone, the base of which at the eastern and western sides is drawn out into comparatively unimportant ridges. Upon the southern side it descends very abruptly by several terraces and high cliffs to the sea. To the northward the slope is more gentle to the river, which is only 1.5 kilometre from the coast. The river at this point has an elevation of 100 metres above the sea-level. The Acropolis of Assos is the highest point south of the Touzla (Satnioeis) river between, Coslou-dagh 7 kilometres to the eastward, and the great plateau about the same distance in the opposite direction. According to the measurements of the present expedition it rises 234 metres above the sea. The low truncated conical form and the bold cliffs upon the seaward slope are best seen from the west, the point from which the view (Plate 6) was taken.

Although the rocks in the vicinity of Assos are of great variety, yet, with the exception of a conglomerate composed chiefly of marl and fragments of limestone, they are all trachytes. They are, however, not all of the same age, nor were they extruded in the same manner. According to differences in age the various modifications may be grouped under three principal trachytes, which in general appearance are quite distinct from one another. For convenience of description these trachytes will be named, beginning with the oldest, the first, second, and third respectively. Besides the tertiary conglomerate and the three trachytes already mentioned, there is also a volcanic conglomerate having a very irregular distribution, and composed of trachytic fragments. In respect to



GEOLOGICAL
MAP OF
ASSOS

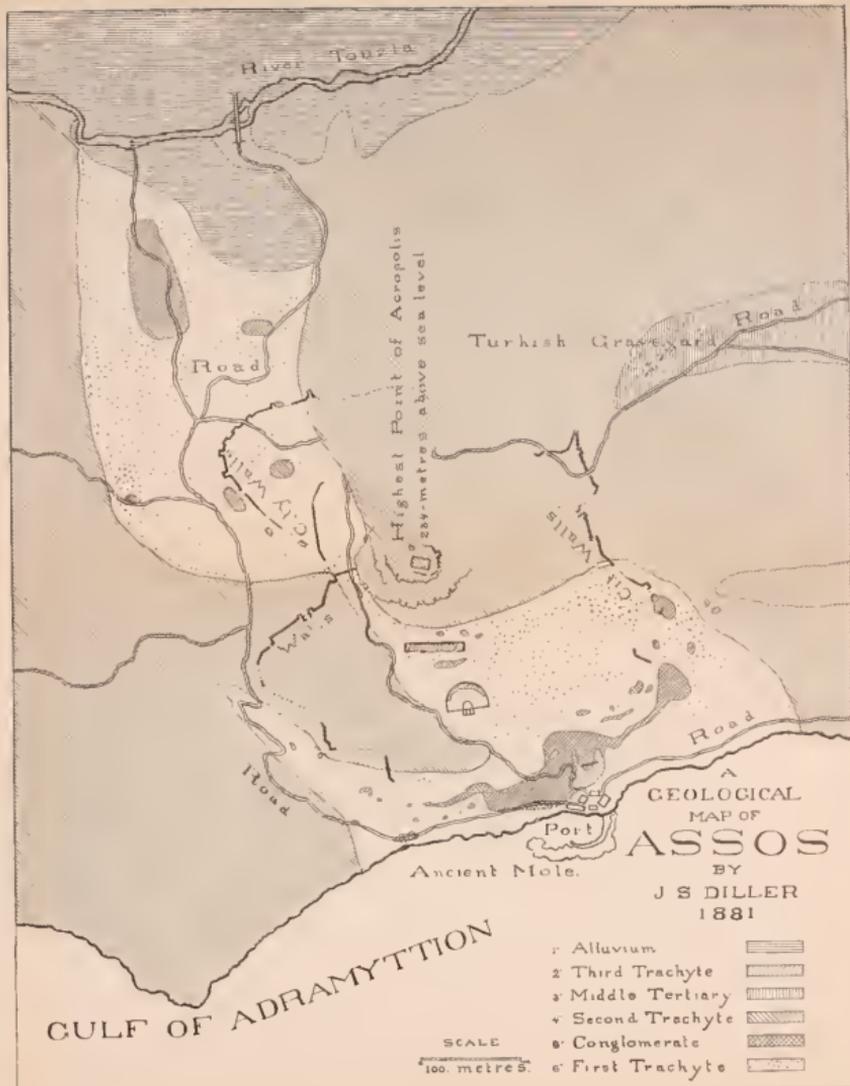
BY
J S DILLER
1881

Ancient Mole.

GULF OF ADRAMYTTION

- 1" Alluvium
- 2" Third Trachyte
- 3" Middle Tertiary
- 4" Second Trachyte
- 5" Conglomerate
- 6" First Trachyte.

SCALE
100. metres.



age it stands between the first and second trachytes. The limestone conglomerate to which reference has been made is older than the third trachyte and younger than the second, upon which it rests. These rocks, beginning with the oldest, will be described in the order of their occurrence.

FIRST TRACHYTE.

This trachyte is one of the most abundant in the immediate vicinity of Assos, and yet from the fact that it leaves few fragments upon the surface it appears to be quite rare as compared with that which forms the Acropolis. It is exposed in two large areas, one south and the other northwest of the Acropolis, connected by a narrow band extending across the hill in a southeasterly direction.

The prevailing color of this trachyte is purple, but it is frequently modified so as to become yellowish or reddish purple, or even brick red. In the compact and uniform ground-mass are imbedded numerous minute feldspars never exceeding two millimetres in length, and generally not half that size. They are either opaque white or glassy, and never so prominent as to greatly modify the color of the rock. Some of the feldspars are distinctly striated, but the majority of them are too small to determine with an ordinary lens. There are small quantities of variously colored accessory minerals scattered in the ground-mass, and others which are frequently found in cavities or crevices. Among the latter hyalite is the most common, occurring in beautiful botryoidal forms.

Of all the trachytes in this region no other preserves so well the peculiarities of its surface at the time of eruption. The upper portion is frequently very cellular and ropy, like that of modern lava. The cells are of all forms and sizes, but are generally elongated in such a way as to show the direction of motion when the trachyte was extruded. They are sometimes drawn out in large curves, indicating the manner in which the molten mass rolled down the steep slope. A yellowish-colored substance lines many of the cells, and they decrease in size and number downwards to a distance of several feet from the surface, where the trachyte becomes very dense. The direction of motion is frequently indicated also by a stream-like arrangement of the porphyritic crystals of feldspar. Occasionally there are imperfectly developed joint planes parallel to

this fluidal structure, and more frequently there is an irregular columnar structure at right angles to the slope.

The elongated cells and other marks which indicate the former fluidity of the first trachyte occur in all parts of the area in which this rock is exposed, and it is important to notice that these lines of fluidal structure point to the Acropolis as a common source from which the trachyte has proceeded.

The form of the hill of Assos, taken in connection with the facts we have just noticed, together with the composition and distribution of the volcanic conglomerate to be hereafter considered, make it evident that the site of Assos was once the crater of an ancient volcano, from which proceeded most of the volcanic rocks in its immediate vicinity. It is probable that there are other ancient volcanic craters in the Southern Troad, but as far as the explorations of the present expedition have extended, the eruptions, excepting those at Assos, have been through large fissures.

VOLCANIC CONGLOMERATE.

The term conglomerate cannot be properly applied to all of the rocks considered under this head, for some of them are fine ashes, the separate particles of which cannot be perceived by the unaided eye. However, the rocks are with few exceptions well-defined conglomerate, and the exceptions are so intimately associated with the conglomerate both in origin and distribution, that all must be considered under one head.

The conglomerate is one of the most varied and by far the most irregularly distributed formation in the vicinity of Assos. It occurs chiefly upon the seaward slope in small areas varying greatly in shape, and rests directly upon the irregular surface of the first trachyte. The small patches are simply the remains of a once more or less continuous sheet of fragmental material filling the depressions in the old trachyte and hanging upon the steep slopes of the hill.

In its most common constitution the conglomerate consists of numerous fragments of trachyte of various sizes up to half a metre in diameter. The light-colored groundmass which generally fills the interstices is sometimes nearly wanting; in that case the rock

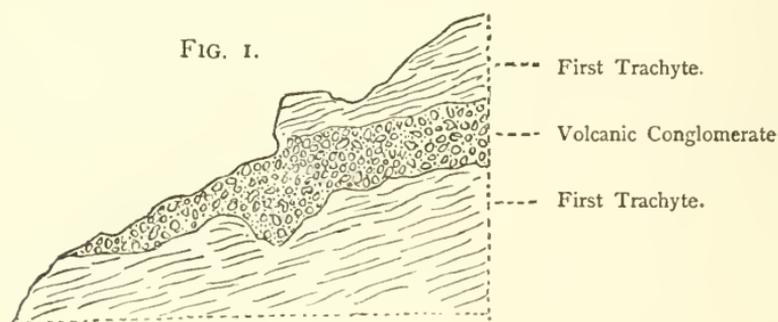
consists of reddish and yellowish cinders thrown together entirely unarranged, in the manner in which they accumulate about the craters of active volcanoes. The fragments are usually light-colored, distorted and fitted into one another as if they had fallen and fused together when in a somewhat plastic state. The scoriaceous variety of the conglomerate is common in the immediate vicinity of Assos, and although the conglomerate frequently occurs in other parts of the Troad, this variety seldom appears. The fine material which constitutes the groundmass is generally ashes, and varies greatly in amount, from the merest trace in the conglomerate of cinders to a rock in which it is the sole constituent. The finest ashy materials are usually quite bright colored, either red or brown, and contain occasionally a few scattered fragments of black scoria. Sometimes, although completely uniform in color, it is made up entirely of small light scoriaceous fragments like some of that at Arthur's Seat, near Edinburgh, and about the recently extinct volcanic crater near Rolandseck, on the Rhine. The fragments in the conglomerate about the hill of Assos are wholly trachytic, and in all cases where it has been possible to identify them they have belonged to the first trachyte. Several doubtful fragments of other rocks have been found in the conglomerate, but from the fact that they cannot be identified they are relatively unimportant.

Upon the seaward slope near the port is a small area of conglomerate, in the light-colored groundmass of which are imbedded numerous very light, small, cellular, fibrous white fragments. This rock, although rare at Assos, is of common occurrence among the stratified deposits of the surrounding country. It varies somewhat in color, and considerably in the size of its fragments, but is always light and porous, closely resembling some of the tufa of the Brohlthal, in Germany. The material of the conglomerate is not rounded and water worn, but has been thrown together in a manner entirely unlike the arrangement such materials would assume under the influence of water.

That the conglomerate is composed of fragments of the first trachyte and rests directly upon it cannot be doubted, for many exposures in the cliffs by the sea, where the conglomerate is most fully developed, show the relation of the two formations very plainly.

The lower part of the conglomerate, where it rests upon the cellular trachyte, is coarse, and composed wholly of cinders. The amount of fine ashy materials increases in the upper part of the formation until the large fragments entirely disappear, and the rock is composed wholly of fine ashes.

There are several excellent exposures, which, besides showing the conglomerate resting upon the first trachyte, exhibit small masses of the latter overlying the former. One of these outcrops upon the seaward slope is represented in the adjoining figure (Fig. 1). The



portions of trachyte which overlie the coarse conglomerate are always small, — very small indeed, as compared with the underlying mass.

It is evident from the relation of the conglomerate to the first trachyte that the eruption of the bulk of the latter took place from the old crater beneath the Acropolis before the formation of the conglomerate; and it is equally apparent, from the composition and distribution of the conglomerate, that it is of volcanic origin, and was thrown out from the same crater. The ejection of the conglomerate, doubtless, followed closely the extrusion of the trachyte, in fact even before the flowing out of the trachyte had completely ceased. Moreover, in the earliest part of the eruption of the fragments, a very coarse material was ejected, and finally the volcanic energy spent itself in showers of ashes. It seems probable that at the time of the eruption of the conglomerate the crater was about as high above the sea level as at present, that is about two hundred metres, for the conglomerate shows no trace of the arrangement it would have assumed under the influence of water.

SECOND TRACHYTE.

Of all the rocks found in this vicinity there are none of more general interest than the one we are now about to consider. It is the celebrated "Sarcophagus Stone" of Assos, and was used not only for the city walls, but also for nearly all the important buildings within them. The temple, with its many sculptured parts, was built of it upon a bold acropolis of the same rock. The second trachyte is the most abundant one occurring in the immediate vicinity of Assos, although it is perhaps not the most abundant trachyte in the Troad as a whole. It forms the Acropolis proper, extending to the river upon the north and northeast, and to the sea upon the southeast. Westward from the Acropolis is a large area extending from the river to the sea, but separated from the Acropolis by a narrow band of the first trachyte and conglomerate. Besides the two large areas already referred to, there is a small one upon the cliffs by the port, where the rock is much fractured and generally of a yellowish or greenish color.

The second trachyte is commonly of a gray, light gray, or purplish gray color, and has prominent porphyritic crystals of feldspar, which sometimes attain a length of eight millimetres, but usually only half that size. Some of the large porphyritic crystals are opaque white, but most of them are clear and glassy, and of the latter a very few appear to be striated. Among the larger crystals are numberless small white crystals of feldspar, varying from 1 to 1.5 millimetre in length, which, notwithstanding the presence of other minerals, gives the prevailing light color to the rock. The groundmass, which is usually only a small portion of the whole, is gray or purplish gray; it has apparently a fine granular porous structure, and the porphyritic crystals are so numerous and irregular that the fracture of the rock is uneven. The whole aspect of the formation is quite granitic, and this resemblance is increased by its containing a variable quantity of small crystals of mica and other iron-bearing minerals, the alteration of which sometimes produces small pits and stains.

The second trachyte has two well-developed sets of joint planes, which have determined the development of the peculiar topographi-

cal features of the Acropolis. One set of planes is for the most part approximately horizontal, and the other nearly vertical. The former divides the rock into distinct layers, and thus gives rise to the small terraces and steps so common about the upper portion of the Acropolis. The layers into which the formation is separated vary in thickness from less than ten centimetres to several metres, and assume the appearance of distinctly bedded rocks of sedimentary origin. There seems to be some connection between this peculiar jointing and a certain concealed structure in the material. At some places, where the formation is massive and a few joints are opened, there are upon the weathered surface elevations and depressions closely resembling those developed in a weathered sandstone composed of thin layers of different degrees of durability. It is evident, also, at several localities that the longer axes of the larger feldspar crystals are not only approximately parallel to one another, but also to the joint planes.

Although this jointing is seldom exactly in a horizontal plane, excepting about the southwestern portion of the Acropolis, yet the deflection is never great, and it is interesting to notice that in general the deflection is such as to cause the layers to slope away from the Acropolis. Although the parallel arrangement of the crystals is not a very common or prominent character, and the quaquaversal dip of the layers not without exceptions, yet they are sufficiently marked to suggest some connection between the jointing and the direction of motion of the trachytic lava at the time of its eruption.

Besides the joint planes already referred to, there is another set nearly vertical. Where these joints are few, they divide the rock into large blocks; but where abundant, irregular columns are produced. The columnar structure is best developed in the bold cliffs of the Acropolis, facing the sea, but there is no approximation to the regular columnar structure so prominent in the trachyte of Wolkenberg, in the Seven Mountains. The cliffs are well shown in the view of the Acropolis from the west, Plate 6.

The jointing results at many places in strewing the surface with innumerable massive boulders. In the region west, north, and northeast of the Acropolis, where the second trachyte occupies large areas, the surface is completely covered with large fragments and ledges overgrown with dwarf oaks.

Occasionally, where this trachyte is in contact with older rocks, instead of separating into large blocks, as is usually the case, it breaks into many small angular fragments, and appears like a mass of breccia. Several small areas of this formation are very deceptive, on account of the fact that where considerable decomposition has taken place along the many small fractures, the rock closely resembles a conglomerate with subangular pebbles.

Although this trachyte is for the most part considerably altered, it generally preserves its appearance of durability. In rare instances, however, it is altered almost to a white micaceous clay, and at other times disintegrates, forming a grayish micaceous sand.

The relation of the second trachyte to the first is made evident by a number of facts. It contains distinct fragments of the first trachyte, which must have been picked up by the second at the time of its eruption. These pieces are not numerous, but yet they are of such a character as to leave no doubt concerning their identity and signification. Small portions of other rocks are quite frequently enveloped by the second trachyte, especially near its junction with older formations, and some of these fragments are very interesting.

It is evident that by the erosion of the second trachyte a considerable portion of the first trachyte has been brought to the surface. Southwest of the Acropolis is a narrow band of the first trachyte extending northwest across the hill, and separating the two large areas of the second trachyte. This belt lies upon a steep slope directly beneath the high cliffs of the Acropolis, and there is abundant reason in the structure and topographical relations for believing that the trachyte of the Acropolis was once connected with that of the large area to the westward.

Beneath the cliffs of second trachyte, a short distance southwest of the Acropolis, a long tongue of the first trachyte extends far to the northwest, and there can be no doubt that this area also has been exposed by the wearing away of the overlying formation.

That the second trachyte is of more recent eruption than the first is made evident, also, by their relation to the volcanic conglomerate. At the western base of the Acropolis, the trachyte of which it is composed rests directly upon the ashes associated with the volcanic conglomerate. Near the port the small mass of second trachyte plainly

overlies the coarse conglomerate, composed wholly of fragments of the first trachyte. This enables us to understand why the conglomerate is associated with the first trachyte only; it reposes upon the first trachyte, and is covered by the second.

It is evident, therefore, notwithstanding the fact that the line of contact between the first and second trachytes is not exposed, that their relative age is fully established by other phenomena. It is perhaps well to notice here that in the Troad the lines of contact between two eruptive rocks, or between one which is eruptive and another of sedimentary origin, are rarely exposed. They are always lines of weakness, and the adjoining rocks are so disintegrated as to afford little evidence concerning their relative age. It is different, however, when the rocks are metamorphosed, for then the lines of contact frequently become durable.

The second trachyte is on the whole uniform, and beyond an occasional streamlike arrangement of the crystals does not show a prominent fluidal structure. Its topographical relations, however, leave no doubt as to the point from which it proceeded. It slopes away in all directions from the Acropolis, and the imperfect columnar structure has a corresponding inclination. The thickness of this trachyte varies greatly, no doubt, but in some places upon the slope north of the Acropolis it certainly reaches thirty metres. In the Acropolis the trachyte rises about twenty metres above the top of the old crater from which the first trachyte was extruded.

From the fact that the second trachyte in the vicinity of Assos proceeded from the Acropolis, and that the Acropolis, itself composed of it, rests directly upon the point from which the first and second trachytes must have issued, it appears that when the eruption of the second trachyte ended the crater was completely closed, and since then the volcano has been extinct. A somewhat similar example may be seen at Arthur's Seat, near Edinburgh.

That there was not a great interval between the eruption of the first and second trachytes is made evident by the fact that much of the scoria upon the surface of the flow was not removed from a steep slope by erosion before the extrusion of the second trachyte occurred. The closing of the vent by the second trachyte enables us to understand why it was not succeeded, as was the first, by a volcanic conglomerate.

The second trachyte was the only one used for making sarcophagi, or having any connection whatever with the burial of bodies at Assos. It seems most probable, therefore, that it was the stone known in antiquity as the "Lapis Assius," or "Sarcophagus Stone." It was reputed to be a good medicine for certain diseases, and to have the peculiar property of consuming within forty days the bodies buried in it. It is impossible to conceive how it came to be considered as having such wonderful properties.

It has been supposed that the trachyte, being an eruptive rock, was in those ancient days still highly heated. But it is evident from the rocks associated with the second trachyte that since its eruption it must have been long beneath the sea, and subsequently long exposed above the sea before the region was inhabited by man, so that there is no probability whatever that the sarcophagus stone was still hot within the historical period. The geological changes which have taken place upon the hill of Assos since the founding of the Greek city, nearly 3,000 years ago, are entirely inappreciable when compared with the great changes which took place in the long period between the eruption of the second trachyte and the habitation of the site by man.

The second trachyte is an excellent building stone, and nearly all the important edifices within the city were constructed of it. It is not only very durable, but even when altered it preserves its original shape with remarkable distinctness. Unlike many other rocks, it rarely crumbles upon the surface, and yet its coarseness unfits it for the sculpturing of delicate forms. Its warm gray color compares favorably with the dull-colored sandstones so commonly used for buildings in America. The only other stones used at Assos for building besides marble were a few blocks of conglomerate in the theatre and of the first trachyte for wall filling.

MIDDLE TERTIARY.

A short distance east of the Acropolis is a small exposure of rocks, which in the immediate vicinity of Assos are very poorly represented. Elsewhere along the southern coast of the Troad they are extensively developed, and will be more fully considered in the second part of this Report.

The formation is chiefly an incoherent conglomerate, consisting for the most part of light-colored fragments of limestone. These are imbedded with more or less of the first trachyte in a whitish marly groundmass, which is sometimes free from pebbles, and appears like a soft sandstone. Some of the calcareous fragments are very hard and heavy; most of them, including a few pebbles from metamorphic rocks, are subangular, varying in size up to twenty centimetres in diameter. The thickness of the whole mass is not over five metres, and it is about 225 metres above the sea level.

The best exposures are at the east end of the Turkish cemetery, where the formation appears to lie upon the second trachyte. These deposits contain no good evidence of their age, but they are closely connected with others further eastward, the relations of which to the other rocks are easily determined. The conglomerate at the cemetery is not distinctly stratified, but the same formation near by is plainly arranged in strata. We may therefore feel sure that the deposit was made under the influence of water.

According to the researches of Tchihatcheff, the sedimentary deposits, a part of which we are considering, were placed provisionally in the middle tertiary, and thought to be of fresh-water origin. But few fossils have been found in this formation, yet it is hoped that those secured by the present Expedition, in connection with some already collected by others, may be sufficient to determine the age of the formation more definitely. It is the upper portion of the middle tertiary that rests upon the second trachyte at the Turkish cemetery; and it appears probable, from facts which will be hereafter mentioned, that the first and second trachytes were extravasated shortly before the close of the middle tertiary period. The disturbance at the time of the eruption of these trachytes did not result in unconformability between the different members of the formation. It was at the close of the period in which the great masses of the third trachyte were extruded, that the whole of the Southern Troad was raised above the sea.

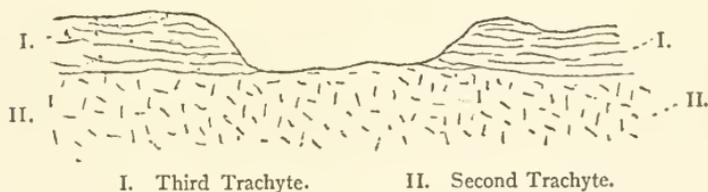
THIRD TRACHYTE.

The third trachyte, which appears to be the prevailing rock in the southern part of the Troad, is represented in the immediate vicinity of Assos by an area southeast of the Acropolis so small that it scarcely appears upon the map.

It is usually dense, and of a reddish or purplish-brown color. The groundmass, as in the first trachyte, forms the greater portion of the rock. In it are imbedded numerous small crystals of feldspar, many of which are glassy, while others are opaque white and irregular in outline. A few small flakes of mica are scattered throughout the rock, and apparently also a few grains of quartz. The formation is frequently cellular, but not because of the expansion of gases, as in the first trachyte. The cells are elongated and irregular in outline, having rough surfaces, as if produced either by the decomposition of minerals or by the flowing of the mass at the time of its extrusion. These cavities are frequently of considerable size, especially where the trachyte contains many fragments arranged parallel to a well-marked fluidal structure. Associated with this trachyte is a very interesting glassy rock, containing more or less of a black substance quite like obsidian in its general aspect, but dull, softer, and breaking easily into small pieces. Occasionally the formation is almost wholly composed of this vitreous material, containing opaque white crystals arranged in parallel lines.

The relation of the second and third trachytes is not so readily determined as that of the first and second. The superposition of the third trachyte upon the second was clearly seen at a locality

FIG. 2.



about one kilometre east of Assos. At this place the fluidal structure of the third trachyte is well developed. The annexed figure

(Fig. 2) illustrates what may be seen in the locality mentioned. The fluidal structure in the third trachyte is represented by the short lines. This rock appears to have been once continuous across the depression in which the second trachyte is exposed. The line of contact could not be found even after several hours' digging in the disintegrated rocks.

The relation of the two trachytes to each other is, however, more certainly indicated by their relation to the middle tertiary deposits of the Southern Troad. The second trachyte, as already noted, is older than the latter portion of the middle tertiary formation, while on the other hand, a short distance east of Assos, the third trachyte distinctly overlies the same deposits, and must, consequently, be of more recent origin.

This trachyte, when developed so as to influence the topography, gives rise to surface features very different from those of the other trachytes. Looking east from Assos, several low, rather irregular ridges will be seen extending in an easterly and westerly direction. In form these ridges closely resemble the trap ridges of the Connecticut Valley, being very steep, with cliffs facing the sea, while to the northward the slopes are gentle. These ridges are formed of the third trachyte, which, like the trap rock of the Connecticut Valley, has been extruded through great fissures between the strata.

ALLUVIUM.

The Touzla River, north of Assos, flows in an alluvial plain, about five kilometres in length by two kilometres in greatest breadth. The soil is fertile, and generally cultivated. By the river bank the brownish sandy loam extends to a depth of one metre and a half, and rests upon a bed of gravel on a level with the present bed of the river. The loam contains numerous very small Gasteropod shells, and is exposed upon the surface of the greater portion of the plain. The latter does not rise more than about two metres above the present bed of the Touzla.

SUMMARY.

In summarizing what is known of the geology of Assos and its vicinity, it may be stated that, as compared with some portions

of the Troad, the formations are quite recent. It seems probable from facts which will be mentioned hereafter that the oldest rocks found at Assos were formed towards the close of the middle tertiary period. The hill of Assos was then a volcano. From its crater issued the first trachyte upon the irregular scoriaceous surface, on which succeeding showers of cinders and ashes were deposited. It seems probable from the general appearance of the conglomerate and the absence of stratification, that the volcano was sub-aërial, rising at least to a height of two hundred metres above the sea level.

The eruption of the first trachyte and conglomerate was followed after a comparatively short interval by another eruption, which brought to the surface the second trachyte and completely closed the crater. There appears to have been no great eruption of gases connected with the extrusion of the second trachyte ; since this was brought to the surface the volcano at Assos has been inactive, although later eruptions have occurred in the neighborhood.

During the latter part of the middle tertiary period the extinct volcano was almost, if not altogether, submerged. At the close of the period an upheaval took place by which the southern part of the Troad was raised perhaps to its present elevation.

Atmospheric agents have since been active in tearing down the formations, and the topographical features resulting from the erosion are those previously determined by the peculiar structure of the rocks. By a long process the deep valley, the plain of the river, the high cliffs, the terraces and the steep slopes of the hill were formed, until finally the present surface was developed and the foundations of Assos were laid.

IV.

NOTES UPON THE GEOLOGY OF THE TROAD.

By J. S. DILLER.

AMONG the numerous works written upon the Troad, there are but few which consider its geology. Of these, the oldest is that by P. Barker Webb, first published in the *Bibliotheca Italiana*, but better known in its French translation as *Topographie de la Troade* issued in 1844.

The most important work is that of Tchihatcheff, who travelled through the Troad in 1847 and 1849, and a few years later published a series of volumes upon Asia Minor. Four of this series are devoted exclusively to geology and palæontology.

Among the more recent contributions is Virchow's *Beiträge zur Landeskunde der Troas*, an excellent paper upon the Anterior Troad, especially upon the Plain of Troy.¹

Unfortunately the present Report is written under such circumstances that the writer is unable to consult the geological literature upon the Troad, or to compare the collections of rocks and fossils made by the Expedition with those already identified.

The following notes are based upon observations made in excursions from Behràm (Assos). All the region embraced within a four hours' journey from that place has been quite thoroughly explored, but elsewhere the boundaries of the various formations have not been fully determined.

The general map of the Troad, as well as the geological map of the same region, both of which are in course of preparation, are not yet ready for publication. In these notes reference will be made to Mr. Clarke's sketch map of Æolic Mysia and Lesbos, Plate 4^a.

The rocks of the Troad are of many varieties, and their relations so complicated that the distribution of them is very irregular, and

¹ See references to these works in the preceding Report, pp. 8, 14.

requires for its determination a great amount of labor. Among the formations of sedimentary origin are those which have been highly metamorphosed, as well as unaltered rocks in various stages of dislocation, and others also which have suffered no change whatever since their deposition.

The eruptive rocks are of yet greater variety, embracing serpentines, basalts, trachytes, granites, and also conglomerates of volcanic origin. Before the relations of these formations can be conveniently described, it will be necessary to consider a few of the leading features in the topography of the Troad.

TOPOGRAPHY OF THE TROAD.

The rivers of the Troad may be considered in four groups. The first embraces the Méndereh (Scamander) and all its ramifications; the second includes the small rivers which carry the water from the western slope into the Ægean; the third, or Touzla group, drains a long, narrow area south of the Méndereh; and the fourth conveys the water of the southern slope into the Gulf of Adramyttion.

Of these groups, that of the Méndereh is the largest and by far the most important. It drains the whole of the central part of the Troad, and gathers nearly as much water as all the other rivers combined. As it touches one side of all the divides which determine the other groups, its gathering ground has a more or less circular outline, and is surrounded upon all sides by rugged mountains, through which the river breaks its way to reach the sea. This topographical arrangement naturally divides the river basin into two parts: a great central portion, including the large area washed by the principal tributaries of the Méndereh, and a portion along the coast, separated from the other by the mountains through which the river has cut its way towards the Hellespont. Each part is distinct from the other, and contains a great plain. The beautiful Plain of Troy, having a length of fourteen kilometres and a width varying from three to five kilometres, extends from Koum Kaleh, near the site of ancient Sigeion, to the mouth of the Thymbrios. Between the Trojan Plain and Eánedeh, which occupies the site of Scamandria, the river passes through a deep gorge cut in the meta-

morphic rocks. This defile is picturesque, especially in the portion nearest Bunárbashi, where its steep sides have many cliffs of gray crystalline limestone. Towards Eánedeh the lower and more gently sloping hills are composed of serpentine and trachyte. From several kilometres below Eánedeh to beyond Beiramitch, near Curshunlou-tepeh, the site of Kebrene, the valley of the Méndereh has an extensive (Samonian) plain. It is long, comparatively narrow, and bordered, especially upon the south, by low undulating hills, which from a distance appear to be a part of the plain itself. An excellent view of this region, and in fact of the whole Troad, may be obtained from Chigri-dagh, upon the summit of which are the extensive ruins of Neandreaia. From all sides of this large plain the tributary streams enter the Méndereh. The largest of these flows in from the south at Eánedeh and is separated from the Touzla by a low divide, upon the southern side of which the flourishing village of Ivadjík is situated. Most of the tributaries during the latter part of the summer are completely dry, and the Méndereh itself is reduced to a mere brook, which sometimes wholly disappears in the limestone gorge below Eánedeh. It is in the fountain head of Mount Ida that the persistent streams arise, and were it not for the water supply of that mountain all the rivers of the Troad would disappear during the dry season. All of the brooks along the western coast and the southern coast as far east as Chípueé, about five kilometres southeast of the ruins of Gárgara, are without water during a large part of the year. Further eastward, however, the small streams are full of clear cold water from the slopes of Caz-dagh, and furnish excellent facilities for irrigating the great olive forests of that region.

The Touzla River, anciently known as the Satnioeis, has a quite remarkable valley, in which are found three alluvial plains. All of these, excepting the Halesian Plain at its mouth, are smaller than those of the Méndereh. The river itself is peculiar in flowing for many miles nearly parallel with the southern coast, which, in the vicinity of Behrà, it approaches within 1.5 kilometre. Of its source in the western portion of the Mount Ida range very little is known. After flowing for some distance between high rugged mountains, the river enters the plain of Ivadjík, which is northeast of the site of Lamponia, upon Coslou-dagh. This plain is long,

narrow, and fertile. Along the northwestern base of Coslou-dagh the river flows through a deep gorge. The pinnacled slopes of coarse angular conglomerate at this place give a peculiarly wild aspect to the scenery. The river then enters the broad fertile plain from which the ancient Assians derived their supplies; turning northwestward, it passes another deep defile, about eight kilometres in length, before reaching the great Halesian Plain of the western coast.

Judging from the distribution of the streams, one would naturally suppose that there was but little system in the arrangement of the mountains of the Troad. This impression is only heightened by a casual study of these highlands, but when their geological structure is fully known, they will be found to be a closely related and extremely interesting group, the diversity in the arrangement of which is due to differences in structure and origin.

Mount Ida, or Caz-dagh (Goose Mountain), as it is known to the Turks, is the chief mountain of the peninsula, and reaches a considerable height above the timber line. Viewed from the great Plain of Edremit, it appears to be a low cone upon a small but lofty plateau. Such is apparently the case from other positions, for the present summit is only a small portion of the rim of a great dome which once formed the top of that grand mountain. The arrangement of the spurs and ridges connected with Caz-dagh is peculiar, and can be fully understood only when the geological structure of that group is better known. It is certain, however, that none of the parts which properly belong to Mount Ida extend beyond the great Plain of Beiramitch, or further west than Dikeleh-dagh, upon a spur of which (Cojaykia-dagh) are situated the remains of ancient Gárgara.

The divide between the valley of the Touzla and that of the Bahchahlé, which is the largest tributary of the Méndereh, is low, and the topography so misleading that the position of Ivadjík, the largest town in the southern part of the Troad, is, upon most maps, incorrectly represented. The watershed south of the one just mentioned, separating the valley of the Touzla from the sea, between the sites of Gárgara and Lamponcia, is comparatively low and broken, thus completing the semicircle of plains and low hills which mark the topographical as well as the geological limits of Mount Ida.

The long, narrow, mountainous belt separating the Touzla from the Gulf of Adramyttion upon the south, has many varied and interesting features. The eastern portion of the southern coast is bordered by a long, narrow, fertile plain at the foot of Caz-dagh, the many fountains of which furnish abundant water for irrigating the extensive olive-groves. Further westward, in the vicinity of Gárgara (from Szleé to Adátepeh), the plain is displaced by bold cliffs and deep ravines facing the sea.

The extensive walls of Lamponcia are upon Coslou-dagh, the form of which furnishes a connecting link between that of the great plateau west of Behrà and the small sharp ridges further eastward. The plateau which ends in the bold promontory at Babácalessi (Lecton) is separated from Coslou-dagh by lowlands out of which rises the imposing Acropolis at Behrà.

Upon the western coast, north of the mouth of the Touzla, is a narrow, undulating plain, widening to the northward, and covered for the most part by extensive forests of valonea oak. From the lower portion of the Touzla Valley towards the site of Neandreaia, the whole country is elevated, supporting numerous peaks, and descending upon all sides abruptly. The height decreases somewhat to the northward, until the prominent serrated ridge of Chigri-dagh is reached, while upon the western coast the bold limestone cliffs of Sacár-kyah form the most noticeable geographical feature in that part of the Troad. Further northward the rounded hills decrease in size, Cárahdagh alone rising to a considerable height above the Trojan Plain.

METAMORPHIC ROCKS.

The metamorphic rocks are widely distributed in the Troad, and have been found to occur in six distinct localities. Some of the areas occupied by them are very small. This is especially true of one at Lìdjah, near the western coast, and two in the southern part of the Troad, within nine kilometres of Behrà. Out of the fourth and somewhat larger tract rises the prominent summit of Sacár-kyah, the high cliffs of which, facing the Ægean, may be seen from all points along the coast. The fifth is more interesting and extensive; it occurs in the hills north of Chigri-dagh, includes the rocks

of Cérah-dagh, and crosses the Ménderch between the Trojan Plain and the Plain of Eánedeh and Beiramitch.

The small patch of metamorphic rocks about nine kilometres north-northeast from Behrám consist chiefly of massive crystalline limestone, usually white. It forms the cliffs of a gorge along the small stream flowing from Ealesfáhkee into the Touzla, and is associated with mica schist, a portion of which is quite calcareous. There are at least sixty metres of limestone overlain by the schist, dipping 11° in an easterly direction. These are in turn surmounted by the tertiary conglomerate, containing many fragments of the strata upon which it reposes.

Northwest of Behrám about nine kilometres, near Golfál, a small exposure of metamorphic limestone and schists occurs in the Valley of the Touzla. This locality is encircled by mountains of trachyte. Upon the right bank of the stream, by the road from Behrám to Golfál, rises a hill composed chiefly of schists. A light-colored quartzose and ferruginous mica schist overlies massive gray crystalline limestone, which upon its weathered surface is very irregular. The strike of the schist is S. 70° E., its dip 30° northerly, and the thickness of the mass about sixty metres. In the lower part of the hill it varies from a light to a bright green color, frequently has an unctuous feel, and consists of soft, flexible, but inelastic laminæ. The chloritic and talcose schists overlie limestone and quartzite, both of which have occasionally a well-marked schistose structure.

The area about Sacár-kyah, near the western coast, a short distance northeast of the site of Larissa, contains a very thick, massive limestone, which forms the bold cliffs of the mountain. Associated with this are thinner crystalline limestones, interstratified with greatly disturbed schists. These are well exposed west of Sacár-kyah, on the road from the village of Tavacleé down to the sea-coast. The path from the base of the mountain to Kioúseh-deréssee crosses a ridge of limestone, and affords one of the finest views to be obtained along the Ægean. Near Eski Stamboul, in the Lídjah Valley, is a small exposure of highly contorted schists, from which issue the several hot springs of that locality.

In the vicinity of Cárah-dagh the metamorphic rocks occupy a large territory, extending from the rugged peaks near the base of Chigri-dagh, northeast across the Ménderch, towards the Sea of

Marmora. The strata of that region are greatly disturbed, highly altered, and intimately associated with old eruptive rocks, so that it is very difficult to determine their exact boundaries. The road from Eánedeh to Eski Stamboul, passing through the flourishing villages of Burgáz and Yayicleé, crosses the formation near its southern limit. About two kilometres east of Burgáz the rocks and soil are bright red and yellow, while a short distance further west the gray limestone forms a fertile tract covered with valonea oak. Near the village the limestones and schists are greatly disturbed by intrusive granite. Upon the road towards Yayicleé, after passing over a small area of rocks which probably belong to the tertiary formation, the vertical schists again appear, and continue to the outskirts of the village.

The deposits in which the deep gorge of the Méndereh, south of the Trojan Plain, has been cut, belong to the metamorphic group. Between Eánedeh and Bunárbashi, after following the river for three kilometres, the path turns to the west over comparatively low round hills of trachyte and serpentine, then, returning to the river, enters the defile in the massive gray crystalline limestone which continues to the plain of Troy. Near Bunárbashi it forms Mount Dáydeh and Bali-dagh, the latter of which is supposed by some to be the site of ancient Troy. The limestone occasionally contains a great deal of quartz, in cavities and veins penetrating the rock in all directions. In the upper portion of the valley of the Kemar (Thymbrius) River are good sections of the metamorphic rocks, showing a dark mica schist and a light greenish schist, probably chloritic, interstratified with large layers of limestone occurring in frequent alternations throughout a great thickness.

Of all the areas of metamorphic rocks in the Troad there are none larger or more interesting, at least topographically, than that of Mount Ida. The altered strata of that locality first appear along the southern coast in a deep ravine between Moussooradleé and Aracleé, where the greenish schist lies beneath the tertiary formation. At the head of the ravine, about six kilometres from the sea, upon the beautiful limestone summit of Cojakia-dagh, are the ruined walls of ancient Gárgara. Associated with the gray limestone and the schists, which in some places are well-marked, evenly bedded mica schists, is a ferruginous quartzite forming the pointed summit

of Dikeleé-dagh. These rocks continue eastward in the high mountains at some distance from the coast to near Edremit, where they reach the sea. In the vicinity of Papazleé, upon the river of the same name, they form the impregnable Acropolis on which are the ruins of Antandros. This Acropolis is an excellent example of what might be called insular erosion in the formation of valleys. The two branches of the rapid stream flow for some distance above their junction in deep parallel gorges. About one kilometre above their confluence the watershed between the two ravines has broken down, leaving this wonderful Acropolis completely isolated, and bounded on all sides by immense cliffs.

From the plain of Edremit the conical summit of Mount Ida seems to rest upon a very elevated plateau, the southern slope of which is furrowed by deep ravines and bold spurs descending to the sea. From Edremit the ascent requires eight hours. The road at first winds across the sandy plain, upon the edge of which are exposed white, gray, and black crystalline limestone, associated with various schists. Leaving the beautiful village of Zytinleé, the path ascends one of the spurs, which is composed at its base of greenish schist and gray or yellowish limestones. The former is greatly contorted, and is the prevailing rock. Its strike is apparently at right angles to the coast, so that the spurs and ravines are parallel to the general strike of the formation of which they are composed. The schist upon the southern slope varies from a true mica schist to one containing a large proportion of hornblende. Occasionally considerable feldspar is present, and produces many small white spots upon the weathered surface. Smooth surfaces polished by friction at the time the rocks were dislocated are common. Sometimes the strata are slightly gneissoid, and their fractures lined with epidote. The slopes of Mount Ida are covered by extensive pine forests, which are the chief source of timber in the Troad. The bare rocky top extends far above the timber line, especially upon the eastern side, and is known to the Turks as the *Chiplak*, — a term which is very conveniently used when reference is made to the whole of the treeless upper portion of the mountain. Northeast of the *Chiplak*, about the head-waters of the Zytinleé River, the black hornblende schists are abundant, and dip away from the summit. The same is true also upon the northern slope of the mountain, where the beds de-

scend towards the head-waters of the Méndereh. This arrangement will be better understood from an examination of the topography and structure of the Chiplak. Its form is, so to speak, a decapitated dome, with its highest point, Mount Gargaros, near the northwestern edge. Once, doubtless, the dome was complete, but now its summit has been carried away by erosion, and instead of being convex, it is concave, quite like a volcanic crater. Surrounding the depression upon the north, east, and south sides, is a rim, which has been broken away towards the southwest by the head-waters of the Monastéri River. The stratification is well-marked, and the structure plainly visible. The upper portion of the Chiplak is composed of three distinct strata, the lowermost of which is a coarsely crystalline white limestone, weathering light gray and appearing in the depressed centre. Upon this rests a gneissoid hornblende schist, which forms the greater portion of the rim. The summit, Mount Gargaros, in the northwestern part of the broken circumference, is composed chiefly of talcose schist containing veins of fibrous minerals, and rests upon the rocks already mentioned. Upon the rim are five peaks, all of which rise a considerable height above its lowest portions, and may be reached by a good path from Gargaros in about half an hour. The view from the Chiplak is extensive, and extremely interesting. It embraces all of the historic region of the Troad and the adjoining portions of Europe and Asia Minor. They are spread out at the feet of the observer as if upon a great map, and more than repay him for the trouble and fatigue he must endure in order to reach that celebrated spot. The descent from the rim is not steep at first upon the east and southeast, but upon the north it is abrupt. The larger portion of the slope is occupied by a variety of schists, among which hornblende schist prevails. It is sometimes almost completely composed of large crystals of hornblende, and is interstratified with actinolite schists and limestones. The latter near the summit are coarsely crystalline, but further northward in the great limestone belt they are finer grained. It is from this belt, which is nearly midway between the top of Gargaros and Evjilár, that the source of the Méndereh issues. The limestone forms very high cliffs, which, owing to the peculiar position of the strata, appear to have a columnar structure. From the base of one of these cliffs are numerous springs, gushing forth as if the whole

mountain were filled with water and just beginning to burst. The rains increase the size of the streams so much, that the cave from which the main spring issues cannot be examined in all seasons.

The metamorphic rocks continue to near the base of the mountain, where they are replaced in the more gentle slopes by those which are granitic. The distribution of the strata and their position, so far as observed, seem to indicate that although the beds are sometimes considerably disturbed, Mount Ida is quite a simple anticlinal, with a very short axis extending east and west, — so short, indeed, that its summit in structure is approximately a dome.

TERTIARY.

The tertiary formation in the Troad occurs chiefly along the coasts, but also in the interior. Many of the areas are small, and they can be most conveniently considered as parts of two large tracts, one of which borders upon the Hellespont and the Ægean, while the other occupies the interior and the shore of the Gulf of Adramyttion. It may be that the rocks of these two regions belong to different periods of deposition, but there can be no doubt that both were formed during the tertiary age. This subject can be discussed to better advantage hereafter, when the fossils collected by the present Expedition have been identified, and the works of other observers in the Troad can be consulted.

The chief exposure along the southern coast extends from Coslou, eight kilometres east of Behrà to the vicinity of Avjilár, which is not far from the site of Aspaneus. In the neighborhood of Papazleé (Antandros) the narrow strip of tertiary is interrupted by a considerable mass of granite. Between Coslou and Aracleé, which is upon the coast south of Gárgara, a broad belt of tertiary strata extends northward across the Valley of the Touzla into that of the Méndereh where it expands so as to reach from near Eánedeh to Beiramitch, a short distance west of the site of Kebrene. This area is broken across by trachyte upon the watershed between the Touzla and the Bahchahleé, which is the largest southern tributary of the Méndereh.

The most complete section of this formation that may be obtained at one exposure, occurs upon the sides of the deep ravine at Aracleé.

The lowest strata of the group are reddish shales and conglomerate, containing well-rounded pebbles of quartzite and other metamorphic rocks. Upon these rest thin-bedded greenish sandstones, interstratified with yellowish shales, some of which are calcareous, altogether having a thickness of about two hundred and forty metres. They form the lower, most gentle part of the slope, above which rise the great cliffs of the overlying massive siliceous limestone. This is usually pale-yellowish colored, soft, light, and porous as if it had been thoroughly leached. Frequently it contains earthy black spots or nodules, and occasionally well-defined small crystals. Specimens from some distance beneath the surface effervesce in acid, but upon the weathered surface the acid is immediately absorbed without effervescence. It is massive, has a thickness of about one hundred and thirty metres, and forms prominent cliffs, in which are caves of considerable size. The upper strata of the section, consisting of thin limestones, shales, and tufas, having a thickness of many metres, are not exposed at Aracleé, but crop out further westward in the neighborhood of Coslou and Behràm.

The conglomerate at the base of the series is exposed at a number of places between Sazleé and Narleé. Near the latter place, upon the slope towards Papazleé, it is very coarse, composed chiefly of pebbles of granite, with some from the metamorphic rocks to the northward. The fragments are all angular or sub-angular, and appear to have been moved only a short distance from their source. In the bottom of a ravine at Ahmájah, it crops out with large round pebbles of altered strata, and has a greater thickness than further east at Aracleé. By the sea, beneath the elevated village of Sazleé, ten kilometres west of Aracleé, the conglomerate is not so coarse; it is associated with a great deal of deep red sandstone; reaches its greatest thickness, about one hundred and seventy-five metres; and in the absence of the massive limestone above, forms a prominent ridge. All of the pebbles of this detrital formation, so far as it is known, were derived from the metamorphic rocks or the older eruptives. Fragments of trachyte or basalt have not been found anywhere in the lower strata of the tertiary upon the southern seaboard.

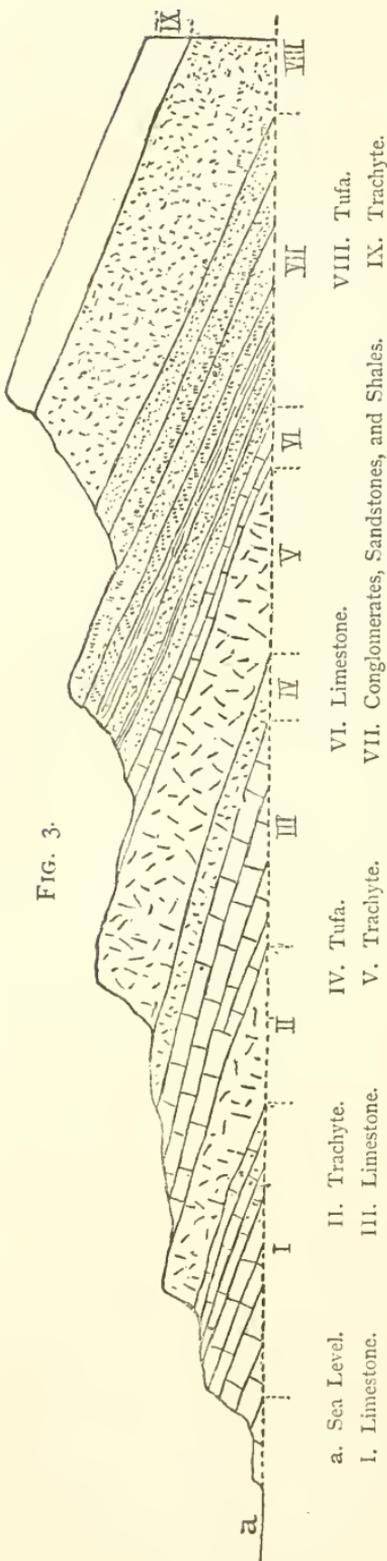
An isolated outcrop of the strata, in the lower part of the series, occurs about eight kilometres northeast of Behràm upon the road

to Ivadjík. Red clays and thin-bedded yellowish limestone are associated with sandstone and conglomerate. The last contains pebbles of quartzite, besides many fragments from the underlying schists.

The most extensive exposure of the shales and sandstones of the lower part of the series is between Chipnéé and Adátepeh, upon the coast, six kilometres southeast of the ruins of Gárgara. In that locality the gray, greenish, and yellowish sandstones and shaly grits form the lower hills, separating the bold limestone cliffs of Adátepeh from the prominent ridges of the same calcareous stratum further westward. These beds are greatly disturbed, and are the source of the hot springs at the Lídjah (hot baths) of that region. They crop out also at Narleé and Avjilár, but have not been seen further eastward.

The massive limestone near the middle of the series is an interesting and perplexing rock. It so resembles in general appearance the trachyte, with which it is intimately associated about Chipnéé (south of Gárgara) and Demearjeé-kioy, that special care needs to be taken in determining its boundaries. It reaches the sea at Ahmájah, and continues in detached masses along the coast for nine kilometres, forming high cliffs separated by profound gorges. These topographical features are a result determined by the position of the strata, for each ravine is upon a gentle anticlinal, while the broad, shallow, synclinal structure preserves the soft limestone within it. This structure is most plainly seen at Adátepeh, which is situated upon the narrowest and most completely isolated synclinal. Its short axis extends northeast and southwest, and it presents bold cliffs to the northwest and the sea. The anticlinal at its western base is broad, and the strata much more disturbed than the tertiary strata elsewhere. The axes of the gentle folds in the tertiary formation of the southern coast are short, and either nearly at right angles to the general trend of the shore line, or else extend northeast and southwest. These disturbances are doubtless accompanied by faults, for upon the coast south of Demearjeé-kioy the massive beds of the conglomerates are found abutting directly against beds of yellowish limestone in another part of the series.

The upper beds of the series, consisting of thin limestones, sandstones, and shales, with tufas and conglomerates made up entirely



of volcanic débris, are not exposed east of Sazléé. The limestones are usually thin-bedded, yellowish or gray; sometimes soft and marly. They are the only beds of the whole series upon the southern coast in which fossils have been found. These fossils, chiefly small Gasteropods, occur in considerable numbers at a few localities, but the range in species is not great. Most of them have been obtained from a little exposure upon Coslou-dagh, about seven kilometres northeast of Behràm. The horizontal marly beds, having a thickness of eight metres, contain numerous large fragments of trachyte, and are completely surrounded by volcanic rocks.

The small outcrops of tertiary rocks, enveloped by trachyte and volcanic conglomerate, are numerous in the southern portion of the Troad, and the relations of the two formations are for the most part distinctly indicated. East of Behràm five kilometres are several of these exposures, and the following section (Fig. 3) represents the relations of the rocks in that locality. The lowest limestone (I.) is siliceous and minutely oolitic, containing in its upper portion numerous fossils. Small Gasteropods are most abundant, and widely distributed in the strata. The small lamellibranchiate mollusk which is so abundant in the limestone of the Trojan Plain and at Eski Stamboul occurs in a thin layer near the middle of this limestone. A dike of trachyte (II.) separates the lowest limestone from the second (III.), which has a thickness of about sixteen metres. It

is of a gray color, rather soft and oolitic, containing numerous small Gasteropod shells. It dips northerly under an angle of twenty degrees, the strike being parallel to the general trend of the southern coast. Over this lies a bed of light-colored tufa and ashes (IV.), which is succeeded by the second dike of trachyte (V.). The third limestone (VI.), having a thickness of only two metres, is soft, light-gray, and marly, containing small Gasteropods, like the ones in the inferior beds. This calcareous stratum is overlain by at least thirty-five metres of greenish conglomerate, sandstones, and shales (VII.). The conglomerate alternates frequently with the sandstone, and contains numerous cellular and compact fragments, apparently identical with the first and second trachytes at Behràm. The upper bed is a greenish sandstone, upon which reposes a large stratum of tufa (VIII.), about thirty metres in thickness. It is composed chiefly of very light, soft, white fibrous fragments, in a light-colored groundmass, containing also a few small pieces of trachyte. The tufa at this place shows no evidences of stratification, but elsewhere similar detritus is definitely arranged. At the top of the section is a large dike of trachyte (IX.), which in the first part of the present Report has been designated the third trachyte. The interposed dikes of trachyte are of the same kind, and both have distinct fluidal structure dipping northerly, parallel with the stratification in the adjoining rocks. This trachyte is not represented among the pebbles in the fragmental rocks of the section, — a fact which indicates that the volcanic rocks are not overflows contemporaneous with the deposition of the formation in which they occur, but are subsequent injections after the deposits were complete. The dislocation and distribution of the stratified rocks is incompatible with any supposition but that which regards them as older than the eruptive formation with which they are associated.

Further westward the amount of volcanic débris in the sedimentary beds increases. Four kilometres west of Behràm, by the sea, is exposed a coarse conglomerate, with a small proportion of fine detritus, having in all a thickness of at least sixty metres. The fragments are well rounded; a few are of compact trachyte; many of quartzite and other metamorphic rocks; but the majority of limestone, apparently like some of that belonging to the tertiary formation. This sedimentary deposit appears to be overlain by

trachyte, above which crops out a section composed wholly of volcanic débris distinctly stratified. The beds consist chiefly of ashes, usually of a gray color, alternating with layers containing numerous large round fragments of trachyte, like that beneath. The upper bed, six metres in thickness, is of reddish-brown and bright-red ashes, upon which rests a mass of trachyte. A well-defined columnar structure is developed in the bright-red ashes along its junction with the overlying formation, but the same structure does not appear in the trachyte. The thickness of the volcanic sediment at this exposure is at least forty metres. The trachyte occurring near the middle of this section is apparently the same as that called the first trachyte in the part of this Report referring to the geology of Assos, while the one at the top of the section is more closely related to that of the Acropolis at Behràm.

Small outcrops of stratified volcanic débris belonging near the top of the tertiary formation are numerous in the southern part of the Troad, and show conclusively that the tertiary strata occupied the whole surface of that region before the great eruption of trachyte occurred. Many of these exposures are of special interest, but cannot be noticed without expanding this Report far beyond its proper limits. Let it be sufficient to mention one more outcrop, which is remarkable on account of the fossils and lignite which it contains. It is only a few hundred metres from the Ægean shore, near Point Deváy, about five kilometres east of Babá-calessi. The exposure is at the foot of the steep slope and high cliffs of trachyte which rise abruptly to the plateau. Half a score of years ago the locality was explored by means of a horizontal drift, eight metres long, in the hope of finding valuable coal. The lignite is lean and earthy upon the surface, but occasionally there are thin laminæ of good quality. Its thickness where greatest is 2.5 metres, but is subject to sudden variations, and it may be traced along the base of that cliff for a distance of fifty metres. The associated rock, both above and below, is gray limestone, containing many fossils, apparently different from those found at other localities. A thickness of more than fifty metres of limestone is exposed; its general strike is parallel to the adjacent coast, and it dips northerly about twenty-five degrees; but near the basaltic rock and trachyte, both of which occur in the immediate vicinity, the position of the strata is such as

to indicate that they were dislocated by the extrusion of the eruptive rocks.

By the path leading from the old excavation to Babá-calessi there are excellent exposures of distinctly stratified rocks, composed wholly of volcanic débris and fragments of eruptive formations. These strata are greatly disturbed, being occasionally nearly vertical. They are evidently older than the trachyte, which forms the mass of the plateau, and with the limestone and lignite apparently belong to the same series as the stratified rocks east of Behràm.

The distribution of the tertiary about the great plain of the Méndereh between Eánedeh and Beiramitch (near Kebrene) has not been completely determined. Upon the road from Beiramitch to Ivadjík the grayish compact limestone crops out near the former place, and closely resembles that along the southern coast near Behràm not only in general appearance, but also in containing the same fossils and being very oolitic. At one locality good specimens of pisolite were found scattered upon the surface. The limestone is frequently earthy or marly, and contains small pebbles of other rocks. The strata are nearly horizontal, and they crop out over a large territory of low rounded hills and ridges along the side of the plain southeast of Eánedeh. The tertiary formation in the valley of the Méndereh is separated from that in the Touzla Valley and the southern coast by a mass of trachyte, but within the narrow belt of this eruptive rock, which is younger than the tertiary strata, there are small exposures of the latter, and there can be no doubt that the deposits of the two large areas in question were once connected. It is a general fact, observable throughout the southern portion of the Troad, that wherever the trachytes are found in contact with the tertiary beds the latter are considerably disturbed, and it is evident that the dislocations are due to the intrusion of the eruptive rocks.

The tertiary bordering upon the Hellespont and the western coast is very fossiliferous, and in this respect appears to be different from that which occurs in the interior and along the southern coast. In the vicinity of the Trojan Plain and the Dardanelles it has been studied recently by Virchow, Calvert, Neumayr, and others whose works the writer is unfortunately not able to obtain at this time.

An excellent section of these rocks is exposed in the steep cliffs

facing the Hellespont, just north of Reu-kioy. The metamorphic and eruptive rocks which limit the tertiary formation south and southeast of the Trojan Plain form irregular mountains, extending from Caráh-dagh, west of the valley of the Méndereh, northeast to the Hellespont. At the base of these mountains the tertiary beds form a low undulating plateau, the strata of which, generally horizontal, gently rise towards the northeast, until in the neighborhood of Chanac-calessi their dislocation is quite marked. Out of the horizontal strata of fossiliferous limestone has been cut the depression occupied by the Trojan Plain, and upon one of the spurs (Hissarlik) projecting into the plain from the east are the celebrated ruins of Troy.

Excellent exposures of a part of this series of rocks occur along the Valley of the Kemar. The lowermost stratum of the group appears to be a marly conglomerate, containing fragments of serpentine and other altered rocks. Sometimes it is a quite compact limestone, but generally it is soft and light colored, having a thickness of about fifteen metres. Upon this horizontal stratum rests another, composed chiefly of red clay, containing many pebbles, but occasionally it is a regular conglomerate of mica-schist fragments mixed with those of other metamorphic rocks. Overlying these strata upon both sides of the valley is a thick layer of basalt, which, in the vicinity of the chiftlik of the American Consul (Mr. Frank Calvert), is itself overlain by red clay and shelly limestone.

At the northeast base of Bali-dagh, near Bunárbashi, the same calcareous conglomerate which occurs in the Kemar Valley, appears to rest unconformably upon the crystalline gray limestone. The soft pebbly bed is composed chiefly of fragments of the limestone upon which it reposes, but contains also numerous pieces of serpentine, and is distinctly overlain by basalt.

At the northwestern extremity of the "Forty Eyes," near Bunárbashi, the conglomerate again occurs, and is composed of large angular fragments of the crystalline limestone, upon which it lies unconformably. At this locality it is overlain by soft sandy strata.

The marly and sandy horizontal beds which form the prominent cliffs facing the Ægean at Yeni-share extend southward along the undulating coast, covered by extensive forests of *valonea óak*. The ruins of Eski Stamboul are upon a soft shelly limestone,

which appears to be connected with that like it about the Trojan Plain. That the tertiary formation around the Plain of Troy is connected with that in the vicinity of Eski Stamboul is rendered very probable, not only by the similarity of the limestones in the two localities both in general aspect and fossil contents, but also by the fact that northeast of Eski Stamboul, about seven kilometres in the neighborhood of Yayicleé, there is a coarse conglomerate, the horizontal beds of which are composed of granite and crystalline limestone pebbles, with those of other metamorphic rocks, and rest directly upon the strata from which they were derived. This conglomerate appears to occupy the same position as that at the base of the tertiary strata in the neighborhood of Bunárbashi.

South of Eski Stamboul one kilometre, the granitic rocks of Chigri-dagh advance westward and reduce the tertiary to a narrow belt by the sea; but further southward, about the supposed site of Larissa, it expands and forms a series of flat-topped hills. The strata are generally horizontal, but sometimes they have a gentle dip and contain many fossils, among which is a small *Ostrea*. A fine exposure of the coarse conglomerate at the base of the tertiary beds, as well as the granite and metamorphic rocks from which it was derived, may be seen upon the road leading from the sea to Tavacleé, which is situated high upon the slopes of Sacár-kyah.

The tertiary formation continues along the western coast to within four kilometres of Babá-calessi. Just north of the mouth of the Touzla the trachytes advance westward from Touzla-dagh, and again reduce the tertiary to a mere strip; but south of the low projecting ridge of trachyte about the great Halesion Plain the tertiary rocks are extensively developed. Near the sea, opposite Touzla, the small tertiary ridges extending across the plain are composed for the most part of very fossiliferous limestone, some of which is compact, but generally soft and marly. The overlying limestone consists wholly of finely comminuted shells, and dips seaward. It has very distinct ripple-marks, with occasional cross-bedding, and must have been deposited in shallow water. Beneath this compact limestone the strata are soft, containing numerous small Gasteropods and other molluscan forms. One stratum is composed wholly of oyster shells. Lower down in the series occurs a conglomerate containing many fragments of trachyte, some of

which closely resemble the oldest of the three trachytes at Behràm. The whole section exposed in the plain has a thickness of about ninety metres.

Upon the eastern edge of the plain, close to the village of Touzla, in the immediate vicinity of several hot springs, occurs a remarkably beautiful section of highly-colored strata, composed almost wholly of volcanic débris. The base of the series of rocks exposed at this place is a conglomerate of scoriaceous fragments of trachyte. This is succeeded by frequent alternations of strata containing coarse and fine sediment, which ranges in size from particles of clay to fragments nearly half a metre in diameter. Many of the larger pebbles are of a light-colored tufa which occurs in the neighborhood, and is used for making millstones. The layers have all varieties of red and yellow color, and present a wonderfully beautiful as well as unique appearance. They are distinctly folded, and small faults are of frequent occurrence. These highly-colored beds have a thickness of about thirty metres, and doubtless owe their extraordinary appearance to the presence of the hot saline springs by which they are surrounded.

No fossils have been found in these strata, but their position, as well as composition, makes it very probable that they belong to the tertiary.

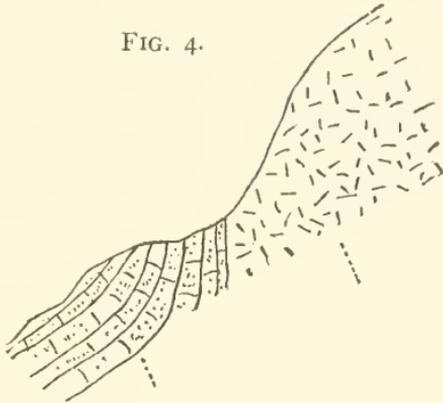
Upon the road between Kioulacleé (Chrysa) and Babá-calessi, about two kilometres from the former place, the tertiary beds may be seen in contact with the trachyte. The strata are marly, light colored, sandy, and pebbly, containing distinct fragments of trachyte and metamorphic rocks. Near the sea the beds are horizontal, and continue in that attitude eastward to the neighborhood of the trachyte, where they are suddenly disturbed and thrown into a vertical position.

Fig. 4 is a representation of the structure in that locality.

It is not known certainly to what portion of the western coast tertiary the strata containing the trachyte fragments belong. It is evident, however, that the conglomerate containing these pebbles is beneath at least sixty metres of compact and marly limestones, in which are found many fossils. It cannot be doubted, therefore, that while some of the trachyte is younger than the tertiary of the western coast, another portion was extruded long before the close of that formation.

In comparing the tertiary strata of the southern coast and the interior with those bordering upon the Hellespont and the *Ægean*, it is to be remarked that there is an apparent difference in the number and character of their fossils. While the latter may be said to

FIG. 4.



be characterized by the abundance of fossils, among which the most prominent and numerous are bivalve mollusks, the other appears to be distinguished by its paucity of organic remains, most of which are small univalve mollusks. It is probable, however, that some of the species are identical in the two faunæ, and that their difference arises rather from unlike conditions than a want of agreement in the time of deposition.

There appears to be no essential difference in their relation to the trachytes. It is evident that while some of the trachytes are younger than the tertiary rocks of both regions, there are others older than the upper strata of the series in each of the two territories; however, upon the western coast the trachytic fragments occur apparently lower down in the series, and the rocks generally are somewhat less disturbed than those along the coast of the Gulf of Adramyttion.

Notwithstanding these differences there are some important points of agreement. In both regions the tertiary beds come in contact with the metamorphic rocks, and the lower stratum is a conglomerate derived directly from the altered strata upon which it rests.

The occurrence of lignite near the shores of the Hellespont,¹ as

¹ Its occurrence northeast of Lapsaké has been described by Tchihatcheff.

well as along the southern coast east of Babá-calessi, and probably also in the interior,¹ indicates that the strata in which it is found in all the localities mentioned are essentially of the same age.

The rocks of both areas occur at elevations high above the sea level, and make it evident that a great change in the configuration of the country has taken place since the period of their deposition. The distribution of the tertiary rocks shows clearly that they were formed before the Hellespont existed, and suggests that what is now the peninsula of the Troad may then have been several islands. It has been shown by the observations of others that the water in which the strata were deposited was either fresh or brackish.

ALLUVIUM.

The alluvium of the Troad occurs chiefly in the plains already noticed in describing the river valleys. Two of the plains are along the Méndereh, and of these the Plain of Troy has been fully described by Professor Virchow, in his excellent work entitled *Beiträge zur Landeskunde der Troas*.

Of the three along the valley of the Touzla only the Halesian Plain by the sea is of considerable importance. It is extensive and fertile, and is nearly divided into two parts by the low ridges of tertiary several kilometres west of Touzla. The old Roman bridge, which once spanned the river where it breaks across these ridges, now stands upon a level plain about two hundred and thirty metres from the present river bed. The amount of filling around it, by which the surface was brought up to the general level of the plain, appears to have been at least two metres. The detritus near the ancient structure is generally very fine, but contains some gravel, and is like that upon other portions of the great plain, whose surface is about two metres above the bottom of the Méndereh. Were it not for the bridge one would not be likely to suspect that formerly the river bed had been at that place. It is an interesting example, showing that great changes have occurred within the last two thousand years.

¹ Good specimens of lignite were shown to the writer at Eánedeh, and were said to have been collected within a two-hours' walk from that place; but their possessor could not be induced to disclose more definitely the locality of his treasure.

The changes which have taken place in the Halesian Plain are recorded in such a way that even the most sceptical cannot doubt them, and are important when considered in connection with those said to have occurred in the Plain of Troy. Although the gravel beds and succession of deep pits containing the stagnant pools of the Kalifatlí Asmák, together with the well-marked banks of a large stream, are proofs that the Scamander once flowed close to the foot of Hissarlik, yet they are not nearly as impressive evidences of recent changes as the presence, in a level plain, of a large bridge far from the stream which it once must have spanned.

ERUPTIVE ROCKS.

A large portion of the rocks of the Troad are eruptive, and their distribution is extremely irregular. The trachytes are by far the most abundant, and occupy an extensive area towards the bold promontory of Babá-calessi. Granitic rocks stand next in abundance and importance as topographical determinants, while the basaltic rocks, and probably also the serpentines, although widely distributed, do not extend over large districts.

SERPENTINE.

The serpentine of the Troad has been found only in the north-western portion south of the Trojan Plain in the vicinity of Caráhdagh, where it is intimately mixed with the limestones and schists of the metamorphic series. Upon the road from Eánedeh to Bunárbashi, about four kilometres from the former, a path turns to the westward, and after passing several considerable elevations of conglomerate and trachyte, ascends the low rounded conical hills of serpentine near the base of Caráhdagh. The rock is usually of a deep green color, but varies, becoming bluish or reddish, and contains small but distinct crystals of a lamellar mineral supposed to be diallage. It is much stained by oxide of iron, and presents many fibrous, smooth surfaces like slickensides. Upon a fresh fracture the rock is usually dull greasy, and occasionally the prominent foliated crystals give it a porphyroid structure. It weathers reddish brown, and in general has a very ancient aspect. An

imperfect columnar structure is occasionally present, but was not seen fully developed anywhere; the rock for the most part being much fractured and decomposed.

Some good exposures of the serpentine occur along the Kemar River, about five kilometres beyond the Plain of Troy. At that locality it is compact, and intimately associated with the schists and limestones, through which it appears to penetrate in the form of irregular dikes. However, the rocks are so much disturbed that its relations are not easily determined. According to Mr. Frank Calvert,¹ the American Consul at Dardanelles, the serpentine occurs in distinct dikes, cutting the crystalline limestone.

The age of the serpentine is definitely shown by its relations to the metamorphic rocks and the tertiary. That it is younger than the former strata is evident from the fact that it cuts them in the form of dikes. Its occurrence as pebbles in the conglomerate at the base of the tertiary series of that region is equally positive evidence that its eruption took place before the deposition of the conglomerate commenced.

GRANITIC ROCKS.

The granitic rocks of the Troad are widely distributed, but the single outcrops are generally small. The largest of them is that east of Beiramitch, near the head-waters of the Méndereh. Quite an extensive mass occurs also about Chigri-dagh, the site of Neandrea, and two smaller exposures may be found along the southern coast near Papazlé and Avjilár. At the latter locality the rock is coarsely granitic, consisting chiefly of amphibole and feldspar, with a smaller but yet considerable proportion of black mica and quartz. The hornblende occurs well crystallized in forms frequently one centimetre long, and half as broad. The feldspar, usually well crystallized, is occasionally distinctly striated. Fragments of the mica schist which occurs in the mountains a short distance north of this locality are enveloped by the granitic rock, which must therefore be more recent than those of the metamorphic series.

¹ Mr. Frank Calvert, the American Consul at Dardanelles, is very familiar with the geology of the anterior Troad, and to him the writer is indebted for valuable assistance while examining the rocks of that region.

The granitic rocks in the neighborhood of Papazleé and Narleé are like those just east of Avjilár. Both exposures are at the foot of Mount Ida, and form low rounded hills, whose gentle slopes are occasionally covered with micaceous sand, resulting from disintegration. Near Narleé the coarse conglomerate at the base of the tertiary series contains many fragments of the underlying granite,—a fact which is conclusive evidence that the latter rock was extruded before the deposition of the tertiary commenced.

Upon the northern side of Mount Ida, between Curshunloutepéh and the source of the Méndereh, the rocks present a similar appearance and composition. In the coarsely crystalline portion hornblende is always abundant, but the amount of mica varies greatly, being at times apparently absent from the unaltered rock, while in the weathered portions it is occasionally nearly as abundant as the amphibole. The rocks are generally coarsely crystalline, much disintegrated, and contain distinct fragments of metamorphic schists, but near their contact with the latter they are finely crystalline, containing quartz, feldspar, and mica in equal proportions, and apparently no hornblende. The relation of this fine granite to the coarsely crystalline rock has not been determined. It occupies a narrow belt upon the gentle slopes at the foot of Mount Ida, without entering as an essential member into the mountain structure.

The irregular serrated ridge of Chigri-dagh is composed of a granitic rock which is not so coarsely crystalline as that of either of the other districts. It forms the low uneven plateau extending west and southwest from Chigri-dagh to the heights close by the sea, where it is limited by a narrow belt of tertiary. The rock consists of quartz, feldspar, and mica, with some amphibole and occasionally large prominent crystals of feldspar, sometimes attaining a length of two centimetres and a thickness of five millimetres. It has evidently been regarded as a trachyte by Tchihatcheff in his extensive works upon Asia Minor, while by Webb it was considered as a granite. The rock is completely crystalline, and is usually quite different from any of the trachytes of the Troad. However, it is variable, and intimately associated with light-colored compact rocks, whose relations have not yet been fully determined. Near Chigri village; and also upon the eastern slope of the mountain

towards Eánedeh, the granitic rocks are penetrated by dikes of a soft, highly altered, light-colored, slightly porphyritic rock, which appears to belong to the trachyte. In the vicinity of Eski Stamboul the crystalline rock has suffered considerable disintegration, but is frequently compact, containing few or many porphyritic feldspars, which appear to have no striations.

North of Chigri-dagh, in the neighborhood of Burgáz, the granitic rocks occur as irregular dikes cutting the metamorphic strata, which are greatly disturbed. The same phenomena may be observed near Tavacleé (near Larissa), about eight kilometres southwest of Chigri-dagh.

At the last locality, as well as seven kilometres northeast of Eski Stamboul, the conglomerate, at the base of the tertiary deposits, contains numerous fragments of the granitic rocks of that region. It is evident, therefore, that the rocks of Chigri-dagh are more recent than those of the metamorphic series, and older than the tertiary strata along the western coast, and, moreover, it appears that all of the granitic rocks of the Troad are of the same relative age.

TRACHYTES.

The trachytes of the Troad occur chiefly in the southwestern portion, where they occupy a large area, extending from the southern coast between Babá-calessi and Coslou, north across the Valley of the Touzla and the high irregular peaks of Touzla-dagh, Kazik-dagh, Cavak-dagh, and Caz-dagh, to Eánedeh, and the plateau of granitic rocks about Chigri-dagh. An irregular arm of trachyte from the large mass extends eastward upon the watershed between the chief southern branch of the Méndereh and the Touzla, and forms the low, broad mountain called Dáydeh-dagh. Several small detached areas occur along the southern coast in the neighborhood of Demearjeé-kioy, Chipneé (south of Gárgara), and Kizil-ketchily, near the site of ancient Astyra.

It is evident that in the vicinity of Behràm there are at least three trachytes, differing not only in general appearance but also in age. It is not possible, however, at present, to separate the various trachytes from one another throughout the whole of the Southwestern Troad. They vary greatly in different parts of the region, and

it is very probable that rocks which are here included under the trachytes when they are better known will be classed among other groups.

The trachyte which in *The Geology of Assos* has been called the first trachyte, occupies a large portion of the area between Behràm and the great plateau further westward, as well as a considerable district about the base of Coslou-dagh towards the east. Its color is usually dark-purplish, but varies greatly. The compact uniform groundmass contains varying quantities of small porphyritic crystals of feldspar, a few of which have the characteristic striæ of plagioclase, but orthoclase is by far the most abundant. The groundmass usually contains a small quantity of minute scales of mica and other dark-colored crystals, some of which are probably hornblende. The upper portion of the trachyte is frequently cellular and scoriaeous, like the surface of a modern lava-flow, and can often be recognized among the pebbles of the tertiary conglomerate of the western and southern coasts, — a fact which clearly indicates that it is one of the oldest trachytes, and yet it occasionally occurs also in the position of the most recent rocks of its kind. About four and a half kilometres northwest of Behràm the trachyte distinctly overlies the ashy beds at the top of the tertiary series, and must be younger than the beds upon which it reposes.

In the vicinity of Balábahny, upon the plateau directly north of the site of Polymedion, a trachyte occurs containing numerous small but distinct crystals of mica and many thin tabular, glassy crystals of orthoclase, some of which attain a length of eight millimetres. The crevices of this rock are often coated with beautifully colored chalcedony. It is much lighter colored than the first trachyte at Behràm, and does not appear to have an extensive distribution. The same trachyte occurs near Babá-calessi, where the crystals are so small that if plagioclase is present it cannot be recognized with a hand-lens. A fresh fracture shows only a small quantity of the accessory minerals, but upon a weathered surface they are more distinctly seen; the small black crystals of mica and greenish hornblende occasionally give to the rock a peppered appearance.

Upon the north side of the Touzla, similar rocks appear near Gulfál, about ten kilometres northwest of Behràm, and extend eastward, occupying most of the area immediately north of the river as

far as Ivadjik. At Pashá-kioy, however, which is directly north of Behrám six kilometres, the rock, although similar in its general appearance to the trachytes already noticed, is essentially different. Its few porphyritic feldspars are for the most part plainly striated, and the crystals of hornblende, much more abundant than the minute scales of mica, sometimes attain a length of five millimetres, and are more prominent upon a fresh fracture than the feldspar. This grayish rock appears less siliceous than the ordinary trachytes, and is not abundant in the Troad, although it occurs at intervals as far north as Chigri-dagh.

The trachyte designated in the first part of this Report as the second trachyte, has a wide distribution, and appears to cover considerable districts. It extends only a short distance east and west of Behrám, and is then replaced by other rocks of the same kind. Commonly its color is light gray, with many irregular milk-white spots, indicating the presence of numerous crystals of feldspar. These vary greatly in size, appearing in tabular form sometimes ten millimetres long and eight millimetres in width. The large crystals are comparatively few, but they are surrounded by innumerable smaller ones, whose limits upon the rough fractured surface of the rock are not distinctly outlined. Within the groundmass, which is irregularly cellular, are numerous small crystals of black mica, and probably a few of hornblende, with small quantities of other accessory minerals. The crystals are so much fractured that the kind of feldspar is not easily determined. All of the larger ones may be orthoclase; the smaller ones, bearing even indistinct striæ, are rare. The granular and porous structure of the groundmass gives to the rock a rough, angular fracture.

This trachyte does not form any important topographical feature south of the Touzla, excepting the Acropolis of Assos, at which place it appears, from facts already presented in the preceding paper, to have been extruded from a volcano before the deposition of the tertiary strata of the southern coast was completed. There is evidence also, but as yet not conclusive, that, at another place three kilometres west of Behrám, this trachyte came up in the form of a dike and overflowed the ashy strata at the top of the tertiary.

Among the high mountains north of the Touzla this trachyte

forms Cavak-dagh and Kazik-dagh. It is of a pale-reddish color, with numerous orthoclase feldspar of less size than those in the Acropolis trachyte at Assos. Further north, near the plateau of granitic rocks about Chigri-dagh, the color is gray, and not so coarsely granular as that in the southern portion of the Troad.

It is in the neighborhood of Eánedeh, however, that this trachyte has its most pronounced form. There the tabular crystals of orthoclase are large, frequently sixteen millimetres long and fourteen millimetres wide. They are usually clear and glassy, and are surrounded by a granular gray groundmass, containing innumerable small white feldspars, apparently orthoclase, besides small quantities of mica and hornblende.

It should be remarked that the determination of the kind of feldspar, by means of a small lens, is in most cases very unsatisfactory, for the crystals are generally small and much fractured, so that the presence or absence of the characteristic striæ is not easily discovered. It is certain, however, that the large crystals of this trachyte are orthoclase, and that some of the crystals in the trachytes already noticed are plagioclase.

The trachyte near Eánedeh containing the large crystals of orthoclase closely resembles in general appearance the Drachenfels trachyte in the Seven Mountains, upon the Rhine, while that already described as occurring at Pashá-kioy appears like the trachyte of Wolkenberg in the same region. The prominent orthoclase crystals are frequently arranged so that their tabular surfaces are approximately parallel,—a phenomenon which has been noticed in the trachyte at Behràm also, but in neither case is it true for the greater part of the rock.

The trachyte named in the first part of this Report the third trachyte, is extensively developed south of the Touzla, but does not reach far to the northward. The groundmass is usually brownish or reddish-brown, and contains, besides minute flakes of mica and small grains of quartz, numerous crystals of feldspar, a portion of which appear to be orthoclase, but are generally too small to be determined with a pocket-lens. Although the rock is sometimes compact, it is generally more or less cellular between the irregular laminæ which mark the fluidal structure. The laminæ are occasionally drawn out so as to produce distinct bands of different

colors continuous for a metre or more, such as may be seen in the felsites of Marblehead Neck, north of Boston. The fluidal structure usually consists of a streamlike arrangement of the small porphyritic crystals and pebbles, as well as the elongated irregular cells, and small darker and lighter portions of the groundmass.

At the base of the dikes of this trachyte, especially where it lies upon fragmental rocks, is commonly found a pebbly rock containing more or less of a soft, black, brittle vitreous substance, which is usually arranged in elongated parallel patches corresponding in position to the fluidal structure in the overlying trachyte.

A portion of the first trachyte has been frequently found scoriaeous, but the same phenomenon has not been observed in connection with the second and third trachytes. The last, being so intimately associated with the ashy strata at the top of the tertiary formation along the southern coast, is frequently full of fragments which it picked up at the time of its eruption. Some of the inclusions evidently belong to the first trachyte, but the majority of them cannot be identified.

The third trachyte is one of the chief topographical determinants along the southern coast. It forms the bold ridge of Coslou-dagh, upon which the ruins of ancient Lamponcia are situated. The northern slope of the mountain is gentle, but upon the south it presents high cliffs towards the sea. At its eastern extremity the trachyte rests directly upon the upper portion of the tertiary formation. The strike of the underlying strata is parallel with the general trend of the mountain, approximately east and west, and the dip is northerly, corresponding to the fluidal structure in the superimposed trachyte. The slope of the sheet of trachyte is in some places so gentle, that it forms a small plateau upon the mountain top. This peculiar feature furnished an excellent site for a large city, where the extensive cyclopean walls of Lamponcia are found.

There can be no doubt that the prominent ridge of Coslou-dagh owes its position to a large dike, and was formed in much the same manner as Mount Holyoke and Mount Tom of the Connecticut Valley. West of Behràm, about eight kilometres, the great plateau begins and extends to Babá-calessi. Although several varieties of trachyte are found in that region, the prevailing one closely resembles the third trachyte at Assos, and occurs in extensive dikes,

the gentle dips of which, like that at Coslou-dagh, determine the existence of the plateau. That the plateau is made up of a series of dikes, or overflows, which gently dip to the northward, can be seen upon the plateau itself, where the dikes occasionally form cliffs facing towards the south, as well as at its eastern extremity, where they overlie the tilted tertiary strata.

In the vicinity of Demearjeé-kioy, about twelve kilometres east of Behràm, occurs a peculiar light-colored trachyte. Enclosed in the fine groundmass of this, are numerous glassy crystals of orthoclase, and some apparently of quartz. The ordinary accessory minerals are almost entirely wanting.

The trachytes of the Troad are frequently much altered, and it is often difficult to obtain good hand-specimens. They generally preserve their form, notwithstanding their alteration, and rarely crumble like the granitic rocks. Of all places where these alterations occur there is perhaps none more interesting than that found in connection with the hot springs at Touzla (*Tragasae*), where the trachytes have a great variety of bright colors, like the sedimentary rocks which they have displaced.

The first and second trachytes at Behràm are among the oldest in the Troad, and flowed, as has been shown in the first part of this Report, from a veritable volcanic crater before the close of the period during which the tertiary strata of the southern coast were deposited. Later the same trachytes appear to have reached the surface through long fissures. The third trachyte, which was erupted through fissures only, was doubtless extruded after the tertiary strata were deposited, and most probably as one of the closing events of the period when the land was raised above the sea level.

CONGLOMERATE.

At many places in the Troad the trachyte is so intimately associated with a conglomerate of the same material, that it is scarcely possible to map the two separately. They are mixed in the most complicated fashion, and it is often difficult to determine their relations.

Excellent exposures of the conglomerate occur in the cliffs by the port of Behràm. It is here composed chiefly of cinders apparently

fused together into an irregular lumpy mass, as described in the preceding paper. A similar conglomerate, composed wholly of red cinders, occurs along the coast about eight kilometres east of Behràm, and also to the westward, but is not of common occurrence elsewhere. Near the small village of Sónobar, three kilometres southwest of the ruins of Lamponeia, the coarse fragmental rock contains, besides scoriated stones, others which are compact, and quite unlike those occurring in the volcanic conglomerate about Behràm. It is in the gorge of the Touzla, however, by the northern base of Coslou-dagh, that the finest exposures of this formation are to be found. It is composed of fragments of all sizes heaped together indiscriminately, and cemented in some places as if by fusion. The stones are usually reddish or black, coarse, compact, and angular, and show no signs whatever of erosion. Cinders are rare at this outcrop. It forms the steep slopes of the gorge in which the river flows between the plain of Ivadjík and that of Behràm. The surface of the rock is extremely rough, and exhibits a marked tendency to form sharp pinnacles and columns. The dark-colored fragments are frequently magnetic, and appear to belong to the basaltic rocks, although the trachytes (so called by all observers in the Troad) occasionally affect the magnetic needle, and render it difficult to obtain correct bearings in the ordinary way.

In the high cliffs by Babá-calessi occurs a cindery conglomerate closely resembling that at Behràm, and appears to rest upon the trachyte with which it is associated. The same is true in part of that in the Touzla Valley at the base of Coslou-dagh, but in the same region also, near the western end of the mountain, the trachyte distinctly overlies the conglomerate.

Among the mountains north of the Touzla and in the vicinity of Ivadjík and Sapandjeé there are extensive areas of fragmental rocks, everywhere intimately associated with the trachytes and the tertiary strata. Their relation to the latter is in some localities difficult to discover. The conglomerate occurs at many places, composed of a great variety of volcanic débris, differing widely in size and weight, and yet there may not be the slightest trace of stratification. Moreover, in the same neighborhood, at an equal height above the sea, distinctly stratified beds of similar volcanic material, belonging to the upper part of the tertiary, may be found.

The facts seem to indicate that what has been proved true at Behràm may be true also of the whole of the region occupied by the trachyte, viz. : that the earlier eruptions of trachyte were accompanied or closely followed by great showers of cinders and ashes. A part of the fragmental material thrown out from craters or fissures may have fallen in water and become stratified ; but it seems to be more probable that the land was subsequently submerged and most of the fine material stratified, while the larger portion of the coarse was not re-arranged.

The fact that the conglomerate is distinctly overlain by trachyte is positive evidence that there were eruptions of the latter subsequent to the formation of at least a part of the former. It is very probable that the conglomerate is not all of the same age, but nothing has as yet been observed to indicate that any part of it is younger than the third trachyte, which forms Coslou-dagh and the plateau south of the Touzla.

BASALTIC ROCKS.

Rocks belonging to the basalt group are widely distributed in the Troad, but always occupy comparatively small areas. One of the largest tracts is between Sazléé and Demearjeé-kioy, about fifteen kilometres east of Behràm. The rock is dark colored, excepting where considerably weathered, in which case it is yellowish gray. It has a well-marked columnar structure, and evidently tilted the adjoining tertiary limestones at the time of its extrusion. Occasionally, near Houssén-fakeé the rock is cellular, but generally compact, while near the coast, south of the trachyte which divides this area into two parts, it is frequently amygdaloidal and of a greenish color. The amygdules are usually chalcedony, but this substance may be enveloped in calcite, or the whole amygdule may be calcareous. The greenish groundmass, sometimes granular, contains numerous small crystals of feldspar, besides other crystals of dark-colored minerals. The rock is generally much fractured, and contains many seams of calcite.

The manner in which this basaltic rock has disturbed the adjoining tertiary strata clearly indicates that the former is younger than the sedimentary rocks with which it is associated. Its relation to the trachyte, however, is not easily determined. The trachyte of that

locality is isolated from the great mass further westward, and forms the rugged hills between Kyalár and Ahmájah. The hills are apparently composed of large dikes of trachyte, dipping northward and presenting cliffs towards the sea. Southwest of Demearjeé-kioy about two kilometres, the trachyte, with its usual strike and dip, cuts directly across the area of basaltic rocks as if it had been forced up through them in reaching the surface. Moreover, upon the south side of the trachyte it appears to overlie the basaltic rocks.

Along the coast directly south of the area described, irregular dikes of basaltic rocks may be seen penetrating the tertiary strata. The same phenomena may be observed in the neighborhood of Aracleé, south of the site of Gárgara. Small exposures occur also in the vicinity of Tactá-kioy (Astyra) and Zytinleé, near Edremit. At the former locality the hot springs appear to owe their origin to the presence of the basaltic rocks from which they rise.

Upon the left bank of the Bahchahleé River, about fifteen kilometres southeast of Eánedeh, at the head of a plain rises the majestic hill called Sapandjeé-tepeh. It is formed of basaltic rocks containing numerous small grains of olivine. The columnar structure in the rock being well developed and nearly vertical, the slopes are very steep, and for the most part perpendicular cliffs. Upon the eastern side, however, where the columns are much contorted, the approach to the summit is not difficult. This prominent hill, rising close to the river and standing at the head of a fertile plain, must have furnished an excellent site for an ancient city; and the traveller is disappointed at not finding fragments of pottery or ruins upon the summit.

At the southern base of Curshunlou-tepeh, the site of ancient Kebrene, by the right bank of the Méndereh, is a small plateau of basalt containing many small crystals of feldspar and bright grains of olivine. This area appears to be quite large, extending west across the river into the hills south of Beiramitch.

The largest exposure, however, which has yet been mapped within the Troad is between Bunárbashi and the valley of the Kemar (Thymbrios) River, at the southern end of the Plain of Troy. The rock is usually compact, containing numerous grains of olivine, but other minerals are not prominent. Occasionally it is very cellular and amygdaloidal. The round and elongated amygdules are of calcite, which forms also numerous irregular veins. In the valley of the Kemar the basalt

distinctly overlies about fifteen metres of marly conglomerate and six metres of red clay, both of which are horizontal, and appear to belong to the tertiary formation. Near the mouth of the river the same basalt is overlain by horizontal red clay and shelly limestone, which appear to be younger than the rock upon which they rest.

While it is evident along the southern coast that the basaltic rocks are younger than the greater portion of the tertiary strata of that region, it may be true that they were extruded before the highest beds of that series were deposited, for the basaltic rocks are not known to pierce those beds anywhere in the Southern Troad.

SUMMARY.

In briefly summarizing the results derived from the observations described in this preliminary Report, the rocks of the Troad may be divided into two groups. The first contains the metamorphic schists, together with their associated eruptive rocks, the granites and serpentines. In the second are placed the tertiary strata, the trachytes, and the basalts. The members of the former are very ancient and highly altered, while those of the latter are comparatively new and fresh. The long interval of time which must have elapsed between the formation of the sedimentary rocks of the two groups has no representative among the deposits of aqueous origin in the Troad, but in other parts of Asia Minor not far distant the series is more complete.

The oldest rocks of the Troad are an extensive series of coarsely crystalline limestones interstratified with micaceous and hornblendic schists. They constitute the basis upon which and out of which the framework of the Trojan peninsula has been developed.

They are the chief mountain-forming strata of that region. The great mass of Mount Ida is composed wholly of them, and along the western coast they give rise to the prominent peak called Sacárkyah.

The structure of Mount Ida appears to be a comparatively simple anticlinal, with so short an axis, extending east and west, that the upper portion of the mountain is approximately a dome.

The position and distribution of the crystalline schists and limestones indicate that, in the early stages of its development, the

peninsula of the Troad was probably represented by several islands, which furnished the detritus for subsequent formations.

The extrusion of the peridotite rocks, from which the serpentines are derived, and the granites occurred some time during the long interval between the deposition of the metamorphic series and the beginning of the miocene.

The most important topographical feature formed of the old eruptive rocks is the peculiar irregularly serrated ridge of Chigridagh, whose rough granitic slopes are the chief landmark in the Northwestern Troad.

The tertiary strata of the western coast are separated from those of the interior and the shore of the Gulf of Adramyttion by a broad belt of trachyte, within which, at intervals, are numerous outcrops of the same strata extending west to within a short distance of Babácalessi. This fact makes it very probable that beneath the sheet of trachyte which has been spread over the surface of the stratified rocks, the latter are connected so as to form one great area bordering the entire coast of the Troad, and occupying a considerable portion of its interior.

The occurrence of deposits of lignite at various places throughout this area, as well as the apparent identity of some of the fossils and the similar relations of the strata upon both sides to the dividing trachyte, make it probable that the stratified deposits of the entire area are essentially of the same age. Those along the shores of the Hellespont have been shown by other observers to have been deposited in fresh or brackish water during the miocene period.

The eruption of the trachytes commenced shortly before the close of the miocene, first, at least in one case, from a crater, and finally through large fissures. The greatest eruption occurred after the completion of the miocene deposits, and most likely as one of the closing events of that period, when the peninsula of the Troad was, for the first time in its essentially finished form, raised above the water.

The extrusion of the trachytes was accompanied by great showers of cinders and ashes, which furnished not only the sediment out of which the upper strata of the miocene were built, but also the material for the unstratified volcanic conglomerate so intimately mixed with the trachytes.

The peculiar drainage of the southern part of the Troad is due to the great east-and-west dikes of trachyte of which Coslou-dagh and the plateau south of the Touzla are composed.

The basaltic rocks were extruded either during the latter part of the miocene or after its close, and their presence has not materially modified the topography of the country.

The Halesion Plain, near the mouth of the Touzla, has been subject to a considerable change, in the position of its stream, within the historical period (two thousand years).

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